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Ohne Hast
Aber ohne Rast,
Drehe sich jeder
Um die eigene Last."

GOETHE.

TRANSACTIONS OF THE AMERICAN GYNECOLOGICAL SOCIETY.

ACADEMY OF MEDICINE TORONTO

VOLUME 33.

FOR THE YEAR 1908.

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CONTENTS.

Officers xi

List of Officers from the Organization to the Present Time xiii

Honorary Fellows xv

Deceased Honorary Fellows xvi

Active Fellows xvii

Minutes of the Thirty-third Annual Meeting xxxi

Constitution lii

By-laws liv

The President's Address: The General Administration of Anesthetics. By J. M. Baldy, M.D. 3

Immediate *versus* Deferred Operation for Intra-abdominal Hemorrhage Due to Tubal Pregnancy. By Florian Krug, M.D. . 11

Deferred Operation for Intra-abdominal Hemorrhage Due to Tubal Pregnancy. By F. F. Simpson, M.D. 19

Immediate *versus* Deferred Operation for Intra-abdominal Hemorrhage Due to Tubal Pregnancy. By Hiram N. Vineberg, M.D. 35

Immediate *versus* Deferred Operation for Intra-abdominal Hemorrhage Due to Tubal Pregnancy. By E. E. Montgomery, M.D. 42

Immediate *versus* Deferred Operation for Intra-abdominal Hemorrhage Due to Tubal Pregnancy. By C. C. Frederick, M.D. 46

Immediate *versus* Delayed (Expectant) Operation in Case of Ectopic Gestation. By Egbert H. Grandin, M.D. . . 49

The Time to Operate in Intra-abdominal Hemorrhage Due to Tubal Pregnancy. By W. P. Manton, M.D. 54

Forty-one Cases of Tubal Pregnancy, with Two Deaths. By A. Lapthorn Smith, M.D. 58

Immediate *versus* Deferred Operation for Intra-abdominal Hemorrhage Due to Tubal Pregnancy. By H. J. Boldt, M.D. . 72

22708

Immediate *versus* Deferred Operation for Intra-abdominal Hemorrhage Due to Tubal Pregnancy. By J. E. Janvrin, M.D. . 77

When Shall the Operation for Tubal Pregnancy be Performed? By B. F. Baer, M.D. 83

Pernicious Anemia and Pregnancy. By Palmer Findley, M.D. 106

Suggestions in Teaching Gynecology, with Demonstration of Special (Mechanical) Charts as an Aid in this Work. By John A. Sampson, M.D. 115

Cystocele. By I. S. Stone, M.D. 145

Second Report on Operations for Relief of Pelvic Diseases of Insane Women, including 411 Patients. A Study of the Character of Operations Appearing to Give the Best Results; also the Character of Insanity Receiving the Greatest Benefit. By LeRoy Broun, M.D. 165

Intrapelvic (Subpubic) *versus* Abdominal Method of Dealing with Mechanical Obstruction to Delivery in Cases of Confinement. By Richard C. Norris, M.D. 182

The Choice between the Intrapelvic and Abdominal Methods of Delivery in the Lesser (Non-absolute) Degrees of Mechanical Obstruction. By Edward Reynolds, M.D. 213

Cesarean Section *versus* Sections of the Pelvis in Dealing with Mechanical Obstructions to Childbirth. By A. Lapthorn Smith, M.D. 227

The Indications for Cesarean Section. By Barton Cooke Hirst, M.D. 232

Intrapelvic *versus* Abdominal Method of Dealing with Mechanical Obstruction to Delivery in Cases of Confinement. By Egbert H. Grandin, M.D. 236

A Glance over the Development of the Technique of Modern Gynecological Operations. By August Martin, M.D. . 264

Abdominal and Vaginal Celiotomy. A Comparative Study of the Value and Effectiveness of These Operations, with Notes on Their Indications and Technique. By J. Pfannenstiel, M.D. 276

The Condition of the Uterine Mucosa in Myoma Cases. By Thomas S. Cullen, M.B. 298

Ventrosuspension an Unsafe Operation for Posterior Displacement of the Uterus during the Childbearing Age. By Edwin B. Cragin, M.D. 322

Is Pubiotomy a Justifiable Operation? An Affirmative Answer Based upon a Personal Experience in Thirteen Cases. By J. Whitridge Williams, M.D. 336

The Heart in Shock. By EUGENE BOISE, M.D. 390
Hospital Gynecology. By ROBERT L. DICKINSON, M.D. . . . 397
Hospital Histories. By ROBERT L. DICKINSON, M.D. . . . 409
Endometritis Exfoliativa—Dysmenorrhea Membranacea. By HUGO EHRENFEST, M.D. 423
An Experimental Study on Hemorrhage following Section of the Uterine and Ovarian Vessels in Dogs, and its Possible Bearing on Ruptured Ectopic Pregnancies. By HUNTER ROBB, M.D. 433
Pressure Conditions within the Abdomen. By RICHARD R. SMITH, M.D. 469
Transplantation of Ovaries. By FRANKLIN H. MARTIN, M.D. . 489
The Intra-abdominal Route for the Removal of Calculi from the Pelvic Portion of the Female Ureter. By DOUGAL BISSELL, M.D. 522
A Report of Fifty-two Pregnancies and Labors following Ventro-suspension of the Uterus for Retrodisplacements. By JOHN OSBORN POLAK, M.D. 535
In Memoriam:
WILLIAM TRAVIS HOWARD, M.D., LL.D. By WILLIAM E. MOSELEY, M D 547

NOTE.

The Society does not hold itself responsible for the views enunciated in the papers read at its meetings.

J. RIDDLE GOFFE, M.D., *Secretary*,
No. 616 Madison Avenue, New York.

OFFICERS AND FELLOWS

OF THE

AMERICAN GYNECOLOGICAL SOCIETY,

1908.

OFFICERS FOR 1908.[1]

PRESIDENT.

J. MONTGOMERY BALDY, PHILADELPHIA.

VICE-PRESIDENTS.

I. S. STONE, WASHINGTON.
EUGENE BOISE, GRAND RAPIDS.

SECRETARY.

J. RIDDLE GOFFE, NEW YORK.

TREASURER.

CHARLES P. NOBLE, PHILADELPHIA.

OTHER MEMBERS OF THE COUNCIL.

EDWARD REYNOLDS, BOSTON.
[To serve one year.]

EMILIUS CLARK DUDLEY, CHICAGO.
[To serve two years.]

RICHARD B. MAURY, MEMPHIS.
[To serve three years.]

CLEMENT CLEVELAND, NEW YORK.
[To serve four years.]

[1] Officers for the ensuing year may be found in the minutes of the meeting page xlviii.

LIST OF OFFICERS

FROM THE ORGANIZATION TO THE PRESENT TIME.

---

* Deceased.

	President.	*Vice-Presidents.*	*Secretary.*	*Treasurer.*
1876.	*Fordyce Barker.	*Washington L. Atlee, *William H. Byford.	*James R. Chadwick.	*Paul F. Mundé.
1877.	*Fordyce Barker.	*Washington L. Atlee, *William H. Byford.	*James R. Chadwick.	*Paul F. Mundé.
1878.	*Edmund R. Peaslee.	*William Goodell, *Isaac E. Taylor.	*James R. Chadwick.	*Paul F. Mundé.
1879.	*T. Gaillard Thomas.	*D. Humphreys Storer, *Henry P. C. Wilson.	*James R. Chadwick.	*Paul F. Mundé.
1880.	*J. Marion Sims.	*W. T. Howard, *Robert Battey.	*James R. Chadwick.	*Paul F.Mundé.
1881.	*W. H. Byford.	T. A. Reamy, *H. F. Campbell.	*James R. Chadwick.	*Paul F. Mundé.
1882.	Thomas Addis Emmet.	*George H. Lyman, *Emil Noeggerath.	*James R. Chadwick.	*Paul F. Mundé.
1883.	*Gilman Kimball.	*Albert H. Smith, *Theophilus Parvin.	Frank P. Foster.	*Paul F. Mundé.
1884.	*Albert H. Smith.	*James R. Chadwick, *Samuel C. Busey.	Frank P. Foster.	Matthew D. Mann.
1885.	*William T. Howard.	Wm. L. Richardson, *Paul F. Mundé.	Frank P. Foster.	Matthew D. Mann.
1886.	Thaddeus A. Reamy.	*Theophilus Parvin, *Geo. J. Engelmann.	Joseph Taber Johnson.	Matthew D. Mann.
1887.	*Alex. J. C. Skene.	John C. Reeve, *Ellwood Wilson.	Joseph Taber Johnson.	Matthew D. Mann.
1888.	*Robert Battey.	*A. Reeves Jackson, *James R. Chadwick.	Joseph Taber Johnson.	Matthew D. Mann.
1889.	*Henry P. C. Wilson.	*William T. Lusk, *Edward W. Jenks.	Joseph Taber Johnson.	Matthew D. Mann.
1890.	John P. Reynolds.	William M. Polk, Ely Van de Warker.	Joseph Taber Johnson.	Matthew D. Mann.
1891.	*A. Reeves Jackson.	Joseph Taber Johnson, William H. Baker.	Henry Clark Coe.	Matthew D. Mann.
1892.	*John Byrne.	Richard B. Maury, *Cornelius Kollock.	Henry Clark Coe.	Matthew D. Mann.

	President.	*Vice-Presidents.*	*Secretary.*	*Treasurer*
1893.	*Theophilus Parvin.	William H. Parish, William H. Baker.	Henry Clark Coe.	Matthew D. Mann.
1894.	*William T. Lusk.	*Samuel C. Busey, Bache McE. Emmet.	Henry Clark Coe.	Matthew D. Mann.
1895.	Matthew D. Mann.	*Geo. J. Engelmann, Clement Cleveland.	Henry Clark Coe.	J. Montgomery Baldy.
1896.	William M. Polk.	*James H. Etheridge, *Fernand Henrotin.	Henry Clark Coe.	J. Montgomery Baldy.
1897.	*James R. Chadwick.	*R. Stansbury Sutton, Henry J. Garrigues.	J. Riddle Goffe.	J. Montgomery Baldy.
1898.	*Paul F. Mundé.	Emilius C. Dudley, *Arthur W. Johnstone.	J. Riddle Goffe.	J. Montgomery Baldy.
1899.	Joseph Taber Johnson.	Howard A. Kelly, A. F. A. King.	J. Riddle Goffe.	J. Montgomery Baldy.
1900.	*George J. Engelmann.	Edward L. Duer, Seth C. Gordon.	J. Riddle Goffe.	J. Montgomery Baldy.
1901.	Ely Van de Warker.	Charles Jewett, Richard B. Maury.	J. Riddle Goffe.	J. Montgomery Baldy.
1902.	Seth C. Gordon.	George M. Edebohls, Edward Reynolds.	J. Riddle Goffe.	J. Montgomery Baldy.
1903.	Joseph E. Janvrin.	*Edward W. Jenks, *A. Palmer Dudley.	J. Riddle Goffe.	J. Montgomery Baldy.
1904.	Edward Reynolds.	J. Whitridge Williams, Edward P. Davis.	J. Riddle Goffe.	J. Montgomery Baldy.
1905.	E. Clark Dudley.	Henry D. Fry, Henry C. Coe.	J. Riddle Goffe.	J. Montgomery Baldy.
1906.	Richard B. Maury.	Howard A. Kelly, Reuben Peterson.	J. Riddle Goffe.	J. Montgomery Baldy
1907.	Clement Cleveland.	Willis E. Ford, J. Clifton Edgar.	J. Riddle Goffe.	J. Montgomery Baldy
1908.	J. Montgomery Baldy.	I. S. Stone. Eugene Boise.	J. Riddle Goffe.	Chas. P. Noble.

HONORARY FELLOWS.

ELECTED

1884. GEORGE GRANVILLE BANTOCK, M.D., 36 Gloucester Place, Portman Square, London, England.

1878. JOHN S. BILLINGS, M.D., LL.D., New York Public Library, 40 Lafayette Place, New York.

1878. J. AMÉDÉE DOLÉRIS, M.D., Paris, France.

1902. THOMAS ADDIS EMMET, M.D., 93 Madison Ave., New York. *Founder.*

1905. WILLIAM GARDNER, M.D., 109 Union Ave., Montreal, Canada.

1901. HENRY J. GARRIGUES, M.D., 11 West 8th St., New York.

1899. D. BERRY HART, M.D., 29 Charlotte Square, Edinburgh, Scotland.

1895. CHARLES JACOBS, M.D., 53 Boulevard de Waterloo, Brussels, Belgium.

1891. CHRISTIAN G. LEOPOLD, M.D., Pfoterhaurstr. 90, Dresden, Germany.

1888. AUGUST MARTIN, M.D., Greifswald, Germany, Wallenburth, 73.

1883. RICHARD B. MAURY, 111 Court St., Memphis, Tenn.

1892. OTTAVIO MORISANI, M.D., Naples, Italy.

1891. ROBERT OLSHAUSEN, M.D., N. Artillerie St., 19, Berlin, Germany.

1907. CHAUNCEY D. PALMER, M.D., Avondale, Cincinnati, Ohio.

1901. KARL PAWLIK, M.D., Spálená Ulice 3ª, Prague.

1908. J. PFANNENSTIEL, Kiel, Germany.

1891. SAMUEL POZZI, M.D., 47 Avenue d'Jena, Paris, France.

1907. THADDEUS A. REAMY, M.D., May and June Sts., Cincinnati, Ohio.

1897. JOHN C. REEVE, M.D., LL.D., Dayton, Ohio. *Founder.*

1903. WILLIAM L. RICHARDSON, M.D., 225 Commonwealth Ave., Boston. *Founder.*

1896. PAUL SÉGOND, M.D., 11 Quai d'Orsey, Paris, France.

1888. ALEXANDER R. SIMPSON, M.D., 52 Queen St., Edinburgh, Scotland.

1901. TH. TUFFIER, M.D., 42 Avenue Gabriel, Paris, France.

1881. FRANZ VON WINCKEL, M.D., Sonenstrasse 16ª, Munich, Germany.

Total, twenty-four Honorary Fellows.

HONORARY FELLOWS.

DECEASED.

ELECTED

1877. JOHN L. ATLEE, M.D., Lancaster, Pa.
1876. ROBERT BARNES, M.D., London, England.
1892. ROBERT BATTEY, M.D., Rome, Georgia. *Founder.*
1897. SAMUEL C. BUSEY, M.D., LL.D., Washington, D. C. *Founder.*
1890. HENRY F. CAMPBELL, M.D., Augusta, Georgia. *Founder.*
1905. JAMES R. CHADWICK, A.M, M.D., Boston. *Founder.*
1889. M. CHARPENTIER, M.D., Paris, France.
1893. CHARLES J. CULLINGWORTH, M.D., London, England.
1877. JOHN C. DALTON, M.D., New York.
1877. J. A. H. DEPAUL, M.D., Paris, France.
1878. J. MATTHEWS DUNCAN, M.D., London, England.
1888. ALEXANDER DUNLAP, M.D., Springfield, Ohio.
1876. JOSEPH A. EVE, M.D., Augusta, Georgia.
1889. ROBERT P. HARRIS, M.D., Philadelphia.
1888. GRAILY HEWITT, M.D., London, England.
1881. J. BRAXTON HICKS, M.D., London, England.
1902. WILLIAM T. HOWARD, Baltimore, Md. *Founder.*
1876. THOMAS KEITH, M.D., London, England.
1888. GILMAN KIMBALL, M.D., Lowell, Massachusetts.
1876. ALFRED H. M'CLINTOCK, M.D., Dublin, Ireland.
1888. EMIL NOEGGERATH, M.D., Wiesbaden, Germany. *Founder.*
1877. CHARLES PAJOT, M.D., Paris, France.
1885. W. S. PLAYFAIR, M.D., London, England.
1888. SIR WILLIAM O. PRIESTLEY, M.D., LL.D., London, England.
1901. M. SAENGER, M.D., Prague.
1877. F. W. VON SCANZONI, M.D., Würzburg, Bavaria.
1876. CARL SCHROEDER, M.D., Berlin, Germany.
1876. GUSTAV SIMON, M.D., Heidelberg, Germany.
1888. D. HUMPHREYS STORER, M.D., Boston. *Founder.*
1905. R. STANSBURY SUTTON, M.D., Pittsburg, Pa.
1882. LAWSON TAIT, ESQ., Birmingham, England.
1881. S. TARNIER, M.D., Paris, France.
1888. ISAAC E. TAYLOR, M.D., New York. *Founder.*
1893. T. GAILLARD THOMAS, M.D., New York. *Founder.*
1882. J. KNOWSLEY THORNTON, ESQ., London, England.
1886. SIR SPENCER WELLS, BART., London, England.
1876. MARMADUKE B. WRIGHT, M.D., Cincinnati.

ACTIVE FELLOWS.

* Denotes Fellows who are deceased.
† Denotes Fellows who have resigned.

1906.—Andrews, Frank T., M.D., Professor of Clinical Gynecology, Northwestern University Medical School; Gynecologist to Marcy and Wesley Hospitals and South Side Dispensary. 100 State Street, Chicago.

1888.—Ashby, Thomas A., M.D., Professor of Diseases of Women, Baltimore Medical College; Professor of Obstetrics and Clinical Gynecology, Woman's Medical College of Baltimore; Consulting Gynecologist to Home for Incurables; Obstetrician and Gynecologist to Good Samaritan Hospital; Gynecologist to Maryland General Hospital; President of Medical and Chirurgical Society of Maryland. 1125 Madison Avenue, Baltimore.

1895.—Ashton, William Easterly, M.D. Professor of Gynecology, Medico-Chirurgical College of Philadelphia; Gynecologist to Medico-Chirurgical and Philadelphia Hospitals. 2011 Walnut Street, Philadelphia.

Founder.—*Atlee, Washington L., M.D. Made Honorary Fellow, 1877.

1886.—Baer, B. F., M.D. Ex-President of Philadelphia Obstetrical Society; Professor of Gynecology, Philadelphia Polyclinic. *Council*, 1895. 2115 Chestnut Street, Philadelphia.

1882.—Baker, William H., M.D. Formerly Professor of Gynecology, Harvard University; Surgeon to the Free Hospital for Women. *Council*, 1887, 1890. *Vice-President*, 1891, 1893. 22 Mount Vernon Street, Boston.

1889.—Baldy, J. Montgomery, M.D. Professor of Gynecology, Philadelphia Polyclinic; Surgeon to the Gynecean Hospital; Consulting Surgeon to the Jewish and the Frederick Douglas Hospitals. *Treasurer*, 1894–1907. *President*, 1908. 2219 De Lancey Place, Philadelphia, Pa.

Founder.—*Barker, Fordyce, M.D., LL.D. 1891.

Founder.—*Battey, Robert, M.D. Made Honorary Fellow, 1892.

1908.—Bissell, Dougal, M.D. Assistant Surgeon to the Woman's Hospital in the State of New York; Consulting Surgeon to the State Hospital (Insane), Central Islip, L. I. 265 West Eighty-first Street, N. Y. City.

Founder.—*Bixby, George H., M.D. 1889.

1896.—Boise, Eugene, A.B., M.D. Gynecologist to Butterworth Hospital. *Vice-President,* 1908. Grand Rapids, Michigan.

1888.—Boldt, Hermann J., M.D. Gynecologist to the German Poliklinik; Gynecologist to St. Mark's Hospital; Consulting Gynecologist to the Beth Israel Hospital; Professor of Diseases of Women, New York Post-Graduate Medical School and Hospital; Fellow of the British and International Gynecological Societies. 39 East Sixty-first Street, New York.

1897.—Bovée, J. Wesley, M.D. Professor of Gynecology, George Washington University; Gynecologist to Columbia, Providence, and George Washington University Hospitals, and St. Elizabeth Hospital for the Insane; Consulting Physician to St. Ann's Infant Asylum. The Rochambeau, Connecticut Avenue and H Street, Washington, D. C.

1878.—†Bozeman, Nathan, M.D. 1886.

1905.—Broun, Le Roy, A.B., M.D., Surgeon to Woman's Hospital in the State of New York; Surgeon to Manhattan State Hospital West (Insane Asylum). 70 West Eighty-second Street, New York.

1881.—Browne, B. Bernard, M.D. Professor of Diseases of Women and Clinical Midwifery, Woman's Medical College of Baltimore; Gynecologist to the Good Samaritan Hospital; Consulting Gynecologist to the Hospital for Consumptives. *Council,* 1886, 1893. 510 Park Avenue, Baltimore.

Founder.—*Buckingham, Charles E., M.D. 1877.

1894.—†Buckmaster, Augustus H., M.D. 1908.

1898.—Burrage, Walter L., A.M., M. D. Gynecologist to St. Elizabeth's and the Carney Hospitals; Surgeon to Outpatients, Free Hospital for Women. 282 Newbury Street, Boston.

Founder.—*Busey, Samuel C., M.D., LL.D. 1901.

1889.—Byford, Henry T., M.D. Professor of Gynecology and Clinical Gynecology, College of Physicians and Surgeons (University of Illinois) of Chicago; Professor of Gynecology, Chicago Post-Graduate Medical School; Surgeon to the Woman's Hospital of Chicago; Consulting Gynecologist to Mary Thomson Hospital for Women and Children, to Chicago Lying-in Hospital and Dispensary, to Provident Hospital, and to Michael Rees Hospital. Reliance Building, 100 State Street, Chicago.

Founder.—*Byford, William H., M.D., LL.D. 1890.

Founder.—*Byrne, John, M.D., M.R.C.S.E. 1902.

Founder.—*Campbell, Henry F., M.D. Made Honorary Fellow, 1890.

Founder.—*Chadwick, James R., A.M., M.D. Made Honorary Fellow, 1905.

1903.—Chipman, Walter William, M.D. Lecturer in Gynecology, McGill University; Assistant Gynecologist to Royal Victoria Hospital. 287 Mountain Street, Montreal, Canada.

1903.—Clark, John G., M.D. Professor of Gynecology, University of Pennsylvania; Gynecologist to University and St. Agnes' Hospitals; Consulting Gynecologist to Woman's and Bryn Mawr Hospitals. 218 South Fifteenth Street, Philadelphia.

1889.—Cleveland, Clement, A.M., M.D. Surgeon to the Woman's Hospital in the State of New York: Consulting Gynecologist to General Memorial Hospital. *Council*, 1894, 1908. *Vice-President*, 1895. *President*, 1907. 59 West Thirty-eighth Street, N. Y.

1888.—Coe, Henry C., A.M., M.D., M.R.C.S. Gynecologist to Bellevue and General Memorial Hospitals; Consulting Gynecologist to the Woman's and New York Foundling Hospitals; Professor of Gynecology in the University and Bellevue Hospital Medical College. *Secretary*, 1891–96. *Vice-President*, 1905. 8 West Seventy-sixth Street, N. Y.

1888.—*Coleman, John Scott, M.D. 1892.

1896.—Cragin, Edwin B., A.B., M.D. Professor of Obstetrics and of Gynecology, College of Physicians and Surgeons, N. Y.; Attending Physician to the Sloane Maternity Hospital; Consulting Obstetric Surgeon to the City Maternity Hospital and the New York Infant Asylum; Consulting

Gynecologist to the New York Infirmary for Women and Children. 10 West Fiftieth Street, New York.

1904.—Cullen, Thomas S., M.D. Associate Professor of Gynecology, Johns Hopkins University; Associate Gynecologist, Johns Hopkins Hospital; Consulting Gynecologist, Church Home and Infirmary. 3 West Preston Street, Baltimore.

1889.—Currier, Andrew F., A.B., M.D. Consulting Gynecologist to McDonough Memorial Hospital, New York, and Ossining Hospital, Sing Sing, N. Y., and Mt. Vernon Hospital, Mt. Vernon, N. Y. 173 East Lincoln Avenue, Mount Vernon, New York.

1893.—Cushing, Ernest W., A.B., M.D. Surgeon to Woman's Charity Club Hospital. 168 Newbury Street, Boston.

1889.—Davenport, Francis H., A.B., M.D. Assistant Professor of Gynecology, Harvard University; Assistant Surgeon to the Free Hospital for Women; Physician to the Department of the Diseases of Women, Boston Dispensary. *Council*, 1891. 419 Boylston Street, Boston.

1891.—Davis, Edward P., A.M., M.D. Professor of Obstetrics, Jefferson Medical College; Professor of Obstetrics and Diseases of Infancy, Philadelphia Polyclinic; Visiting Obstetrician to the Jefferson, Philadelphia, and Polyclinic Hospitals; Clinical Professor of Pediatrics, Woman's Medical College. *Council*, 1896, 1899. *Vice-President*, 1904. 250 South Twenty-first Street, Philadelphia.

1892.—Dickinson, Robert L., M.D. Surgeon (Gynecologist) to Brooklyn Hospital; Obstetrician-in-Chief, Methodist Episcopal Hospital; Consulting Gynecologist, St. Mary's Hospital, Jamaica. 168 Clinton Street, Brooklyn, N. Y.

Founder.—*Drysdale, Thomas M., A.M., M.D. 1904.

1889.—*Dudley, A. Palmer, M.D. 1905.

1886.—Dudley, Emilius Clark, A.B., M.D. Professor of Gynecology, Chicago Medical College; Fellow of the British Gynecological Society. *Council*, 1891, 1893, 1906–1909. *Vice-President*, 1898. *President*, 1905. 1619 Indiana Avenue, Chicago.

1879.—Duer, Edward L., A.M., M.D. Gynecologist to the Presbyterian Hospital; Visiting Obstetrician to Preston Retreat; Consulting Obstetrician to Philadelphia Maternity, etc. *Vice-President*, 1890. 1606 Locust Street, Philadelphia.

1891.—*Edebohls, George M., A.M., M.D. 1908.

1893.—Edgar, James Clifton, Ph.B., A.M., M.D. Professor of Obstetrics, Cornell University Medical College of New York; Obstetric Surgeon to the Mothers' and Babies' Hospital; Obstetrician to the Emergency Lying-in Hospital. *Vice-President*, 1907. 28 West Fifty-sixth Street, New York.

1907.—Ehrenfest, Hugo, M.D. Assistant Professor of Obstetrics, St. Louis University; Physician-in-Chief, St. Louis Obstetric Dispensary; Obstetrician, Jewish Hospital; Consulting Gynecologist, St. Ann Maternity. 4619 McPherson Avenue, St. Louis, Mo.

1887.—Emmet, Bache McE., M.D. Professor of Gynecology, New York Post-Graduate Medical School and Hospital; Surgeon to the Woman's Hospital in the State of New York. *Vice-President*, 1894. 18 East Thirtieth Street, N. Y.

1895.—Emmet, John Duncan, M.D. Gynecologist to St. Vincent's Hospital. 91 Madison Avenue, New York.

Founder.—Emmet, Thomas Addis, M.D., LL.D. Made Honorary Fellow, 1902.

Founder.—*Engelmann, George J., A.M., M.D. 1903.

1890.—*Etheridge, James H., A.M., M.D. 1899.

1904.—Findley, Palmer, B.S., M.D. Professor of Gynecology, College of Medicine, University of Nebraska. 3602 Lincoln Boulevard, Omaha, Neb.

1889.—Ford, Willis E., A.M., M.D. Medical Director, St. Luke's Hospital; Professor of Electro-Therapeutics, University of Buffalo; Lecturer on Electro-Therapeutics, New York University and Bellevue Medical School. *Council*, 1893. *Vice-President*, 1907. 266 Genesee Street, Utica, N.Y.

1881.—†Foster, Frank P., M.D. 1895.

1902.—Frederick, Carlton C., B.S., M.D. Professor of Clinical Gynecology, University of Buffalo; Surgeon-in-Chief, Buffalo Woman's Hospital. 64 Richmond Avenue, Buffalo, N. Y.

1890.—Fry, Henry D., M.D. Professor of Obstetrics, Medical Department of Georgetown University. 1133 Fourteenth Street, N. W., Washington, D. C.

1876.—Garrigues, Henry J., M.D. Made Honorary Fellow, 1901.

1888.—Gehrung, Eugene C., M.D. President and Chief of the Gynecological Department of the South Side

Dispensary; Consulting Gynecologist of the Missouri Baptist Sanitarium: Corresponding Member of Société Obstétricale et Gynécologique de Paris; Membre Titulaire de la Société Française d'Électrothérapie. "The Beers," St. Louis, Mo.

1904.—GELLHORN, GEORGE, M.D. Gynecologist to St. Luke's Hospital; Consulting Gynecologist to City Insane Asylum. 32 Linmar Building, St. Louis, Mo.

1881.—†GILLETTE, WALTER R., M.D. 1889.

1891.—GOFFE, J. RIDDLE, Ph.M., M.D. Professor of Gynecology, New York Polyclinic Medical School and Hospital, and Dartmouth Medical College; Attending Surgeon to the Woman's Hospital in the State of New York; Consulting Gynecologist, N. Y. City Hospital, St. Joseph's Hospital, Yonkers, N. Y., and to Mt. Vernon Hospital, Mt. Vernon, N. Y. *Council*, 1896. *Secretary*, 1897–1908. 616 Madison Avenue, N. Y.

Founder.—*GOODELL, WILLIAM, A.M., M.D., LL.D. 1895.

1877.—†GOODMAN, JOHN, M.D. 1892.

1888.—GORDON, SETH C., M.D., LL.D. Lecturer on Diseases of Women, Portland School of Medical Instruction; Surgeon to the Maine General Hospital; Consulting Surgeon to the Maine Eye and Ear Infirmary; President of the Maine Academy of Medicine and Science; Ex-President of the Maine Medical Association; Ex-President of the Section of Obstetrics and Gynecology of the American Medical Association; Fellow of the British Gynecological Society. *Council*, 1892. *President*, 1902. Portland, Maine.

1890.—GRANDIN, EGBERT H., M.D., Consulting Gynecologist to the French Hospital; Attending Gynecologist to Columbus Hospital. 116 West Seventy-sixth Street, N. Y.

1886.—GREEN, CHARLES M., A.B., M.D. Professor of Obstetrics, Harvard University; Senior Visiting Surgeon for Diseases of Women, Boston City Hospital; Visiting Physician to the Boston Lying-in Hospital. *Council*, 1895, 1899. 78 Marlborough Street, Boston.

1887.—*HANKS, HORACE TRACY, M.D., LL.D. 1900.

1895.—HARRIS, PHILANDER A., M.D. Gynecologist to the Paterson General Hospital and to Passaic General Hospital; Corresponding Member of the Obstetrical and Gyne-

cological Society of Paris, France (1885). 26 Church Street, Paterson, N. J.

1894.—Harrison, George T., A.M., M.D. 63 West Fifty-first Street, New York.

1894.—*Henrotin, Fernand, M.D. 1906.

1891.—Hirst, Barton Cooke, M.D. Professor of Obstetrics, University of Pennsylvania; Obstetrician to the University and Maternity Hospitals; Visiting Obstetrician to the Preston Retreat: Gynecologist to the Howard Hospital and to the Southeastern Hospital for Women and Children; Consulting Obstetrician to the Lying-in Charity. 1821 Spruce Street, Philadelphia.

1892.—*Holmes, Horatio R., M.D. 1896.

Founder.—*Howard, William T., M.D. 1907.

1885.—*Hunter, James B., M.D. 1889.

1891.—Ingalls, Phineas H., A.M., M.D. Gynecologist to the Hartford Hospital. 49 Pearl Street, Room 52, Hartford, Conn.

Founder.—†Ingham, James V., M.D. 1889.

1877.—*Jackson, A. Reeves, A.M., M.D. 1892.

1889.—*Jaggard, W. W., M.D. 1896.

1886.—Janvrin, Joseph E., M.D. President of the New York Obstetrical Society (1889-1891); Consulting Surgeon to St. Elizabeth's Hospital. *Council*, 1889, 1892. *President*, 1903. 191 Madison Avenue, New York.

1895.—Jarman, George W., A.M., M.D. Gynecologist to the General Memorial Hospital; Obstetric Surgeon to the New York Maternity Hospital. 54 West Seventy-sixth Street, New York.

Founder.—*Jenks, Edward W., M.D., LL.D. 1903.

1885.—Jewett, Charles, A.M., M.D. Professor of Gynecology and Obstetrics, Long Island College Hospital, Brooklyn; Attending Physician to Long Island College Hospital; Consulting Obstetrician to Kings County Hospital; Fellow of the British Gynecological Society. *Council*, 1895, 1897. 330 Clinton Avenue, Brooklyn.

Founder.—Johnson, Joseph Taber, A.M., Ph.D., M.D. Professor of Gynecology, University of Georgetown; Gynecologist to the Providence Hospital; President of the Woman's Dispensary; President of the Medical Society of the District of Columbia (1887); Member of the British Medical Associa-

tion; Fellow of the British Gynecological Society; President of the Washington Obstetrical and Gynecological Society. *Secretary*, 1886–90. *Vice-President*, 1891. *Council*, 1881, 1885, 1897. *President*, 1899. 926 Farragut Square, Washington, D. C.

1886.—*Johnstone, Arthur W., A.M., M.D. 1905.

1892.—*Keating, John M., M.D., LL.D. 1893.

1887.—Kelly, Howard A., M.D. Professor of Gynecology and Obstetrics in Johns Hopkins University; Gynecologist and Obstetrician to the Johns Hopkins Hospital; Consulting Surgeon to the Kensington Hospital for Women, Philadelphia. *Vice-President*, 1899, 1906. 1418 Eutaw Place, Baltimore, Md.

1886.—King, Albert F. A., A.M., M.D. Professor of Obstetrics and Diseases of Women and Children in the Medical Department of the Columbian University, Washington, and in the University of Vermont; President of the Washington Obstetrical and Gynecological Society (1885–87); Fellow of the British Gynecological Society; Consulting Physician to the Children's Hospital, Washington; Consulting Physician to the Woman's Dispensary. *Council*, 1898. *Vice-President*, 1899. 1315 Massachusetts Avenue, N. W., Washington, D. C.

1892.—Kirkley, Cyrus A., M.D. Toledo, Ohio.

1888.—*Kollock, Cornelius, A.M., M.D. 1897.

1891.—Krug, Florian, M.D. Gynecologist to the Mt. Sinai and the German Hospitals. 616 Madison Avenue, New York.

1881.—*Lee, Charles Carroll, A.M., M.D., LL.D. 1893.

Founder.—*Lusk, William T., A.M., M.D., LL.D. 1897.

Founder.—*Lyman, George H., M.D. 1891.

1892.—McLean, Malcolm, M.D. Surgeon to St. Andrew's Infirmary for Women; Consulting Gynecologist to the Randall's Island Hospitals. 31 East One Hundred and Twenty-sixth Street, New York.

1891.—†MacLaren, Archibald, B.S., M.D. 1903.

1892.—MacMonagle, Beverly, M.D. 240 Stockton Street, San Francisco, Cal.

1882.—Mann, Matthew D., A.M., M.D. Professor of Obstetrics and Gynecology, University of Buffalo; Gynecolo-

gist and Consulting Obstetrician to the Buffalo General Hospital. *Treasurer*, 1884–95. *President*, 1895. 37 Allen Street, Buffalo, N. Y.

1901.—Manton, Walter Porter, M.D. Clinical Professor of Gynecology and Adjunct Professor of Obstetrics, Detroit College of Medicine; Gynecologist to Harper Hospital and to the Eastern and Northern Michigan Asylums for the Insane; Consulting Gynecologist to St. Joseph's Retreat; Visiting Obstetrician and Vice-President of Medical Board, Woman's Hospital and Infants' Home; Member of the Committee for the Examination of Midwives, Detroit Board of Health; Fellow of the British Gynecological Society. 32 Adams Avenue, Detroit, Mich.

1908.—Martin, Franklin H., M.D. Professor of Gynecology Post-Graduate Medical School of Chicago; Surgeon to the Post-Graduate Hospital, the Woman's Hospital, and the Charity Hospital, Chicago. 103 State Street, Chicago, Ill.

1883.—Maury, Richard B., M.D. *Council*, 1886, 1888, 1907–8. *Vice-President*, 1892. *President*, 1906. Became Honorary Fellow, 1908. 111 Court Street, Memphis, Tenn.

1894.—Montgomery, Edward E., A.M., M.D. Professor of Clinical Gynecology, Jefferson Medical College; Gynecologist to Jefferson Medical College and to St. Joseph's Hospitals; Obstetrician to the Philadelphia Hospital. 1703 Walnut Street, Philadelphia.

1891.—Moseley, William E., M.D. Professor of Diseases of Women, Baltimore Medical College; Gynecologist to the Maryland General Hospital. *Council*, 1897. 614 North Howard Street, Baltimore, Md.

Founder.—*Mundé, Paul F., M.D., LL.D. 1902.

1890.—Murray, Robert A., M.D. 112 West Eightieth Street, New York.

1904.—Newell, Franklin Spilman, A.B., M.D. Outpatient Physician, Boston Lying-in Hospital; Assistant Visiting Physician, Department of Gynecology, Boston City Hospital; Assistant in Obstetrics and Gynecology, Harvard University. 379 Beacon Street, Boston, Mass.

1894.—Newman, Henry Parker, A.M., M.D. Professor of Obstetrics and Clinical Gynecology, College of Physicians and Surgeons of Chicago; Professor of Gynecology, Chicago Post-Graduate Medical School; Surgeon (Department of

Diseases of Women) to St. Elizabeth, Post-Graduate, and Chicago Hospitals. 108 State Street, Chicago.

1891.—Noble, Charles P., M.D. Surgeon to Kensington Hospital for Women; Lecturer on Gynecology, Philadelphia Polyclinic. *Council*, 1899. *Treasurer*, 1908. 1509 Locust Street, Philadelphia.

1902.—Noble, George Henry, M.D. Gynecologist to Grady Hospital. 131 Pryor Street, Atlanta, Ga.

Founder.—*Noeggerath, Emil, M.D. Made Honorary Fellow, 1888.

1893.—Norris, Richard C., A.M., M.D. Lecturer on Clinical and Operative Obstetrics, Medical Department, University of Pennsylvania; Physician-in-Charge, Preston Retreat; Gynecologist to the Methodist Episcopal Hospital and to the Philadelphia Hospital. 500 North Twentieth Street, Philadelphia.

1880.—Palmer, Chauncey D., M.D. Made Honorary Fellow, 1907.

1885.—†Parish, William H., M.D. 1903.

Founder.—*Parvin, Theophilus, M.D., LL.D. 1898.

Founder.—*Peasley, E. Randolph, M.D., LL.D. 1880.

1895.—Penrose, Charles B., A.M., Ph.D., M.D. 1331 Spruce Street, Philadelphia.

Founder.—†Penrose, Richard A. F., A.M., M.D., LL.D. 1885.

1897.—Peterson, Reuben, A.B., M.D. Professor of Gynecology and Obstetrics, University of Michigan; Gynecologist and Obstetrician to the University Hospital. *Vice-President*, 1906. Ann Arbor, Mich.

1908.—Polak, John Osborne, M.D. Professor of Obstetrics, Dartmouth Medical College, and of Obstetrics and Gynecology, Brooklyn Post-Graduate Medical School; Adjunct-Professor of Obstetrics and Gynecology, L. I. College Hospital; Obstetrician, Methodist Episcopal Hospital; Gynecologist, Jewish, Williamsburg, and Deaconness' Hospitals. 287 Clinton Avenue, Brooklyn, N. Y.

1881.—Polk, William M., M.D. Professor of Obstetrics and Diseases of Women and Children, Cornell University Medical College; Physician to Bellevue Hospital and to the Emergency Lying-in Hospital; Consulting Gynecologist to St. Luke's and St. Vincent's Hospitals. *Vice-President*,

1890. *Council*, 1891. *President*, 1896. 7 East Thirty-sixth Street, New York.

1892.—*Pryor, William R., M.D. 1904.

1877.—Reamy, Thaddeus A., A.M., M.D., LL.D. Made Honorary Fellow, 1907.

Founder.—Reeve, John C., M.D., LL.D. Made Honorary Fellow, 1897.

1890.—Reynolds, Edward, M.D. Visiting Surgeon, Free Hospital for Women. *Council*, 1894–1896, 1905–1908. *Vice-President*, 1902. *President*, 1904. 65 Marlborough Street, Boston.

1887.—*Reynolds, John P., M.D. 1896.

Founder.—Richardson, William L., M.D. Made Honorary Fellow, 1903.

1892.—†Ritchie, Park, M.D. 1894.

1896.—Robb, Hunter, M.D. Professor of Gynecology, Western Reserve University. 702 Rose Building, Cleveland, Ohio.

1906.—Sampson, John A., M.D., Lecturer in Gynecology, Albany Medical College; Gynecologist to the Albany Hospital. 180 Washington Avenue, Albany, N. Y.

1879.—*Scott, John, M.D., M.R.C.S.I. 1886.

1907.—Simpson, Frank Farrow, A.B., M.D. Gynecologist, Allegheny General Hospital; Consulting Gynecologist, Columbia Hospital. 1112 Bessemer Building, Pittsburg, Pa

Founder.—*Sims, J. Marion, M.D., LL.D. 1883.

Founder.—†Sinclair, Alexander D., M.D. 1894.

Founder.—*Skene, Alexander J. C., M.D. 1900.

Founder.—*Smith, Albert H., M.D. 1886.

1892.—Smith, A. Lapthorn, A.B., M.D., M.R.C.S. (Eng.). Fellow of the London Obstetrical Society; Fellow of the Société de Médecine Pratique, Paris; Professor of Clinical Gynecology in Bishop's College; Surgeon-in-Chief to Samaritan Free Hospital for Women; Gynecologist and Consulting Surgeon to the Montreal Dispensary; Gynecologist to the Western Hospital. 238 Bishop Street, Montreal, Canada.

1905.—Smith, Richard R., M.D. Surgeon to Butterworth Hospital. Grand Rapids, Michigan.

1898.—Stone, Isaac S., M.D. Clinical Professor of Gynecology, University of Georgetown; Gynecologist to

Columbia Hospital for Women; Fellow of British Gynecological Society. *Vice-President*, 1908. Connecticut Avenue and L Street, N. W., Washington, D. C.

1905.—Stone, William Stephen, A.B., M.D. Instructor in Gynecology, Columbia University; Chief of Clinic, Department of Gynecology, Vanderbilt Clinic. 41 West Seventy-first Street, New York.

Founder.—*Storer, D. Humphreys, M.D. 1903.

1891.—*Strong, Charles P., A.B., M.D. 1893.

1879.—*Sutton, R. Stansbury, A.M., M.D., LL.D. Made Honorary Fellow, 1905. 1906.

1906.—Taussig, Frederick Joseph, A.B., M.D., Assistant Gynecologist, Washington University; Gynecologist to St. Louis Skin and Cancer Hospital. 2318 Lafayette Street, St. Louis, Mo.

1905.—Taylor, Howard C., Ph.B., M.D. Junior Attending Gynecologist, Roosevelt Hospital; Instructor in Gynecology, Columbia University. 24 West Fiftieth Street, New York.

Founder.—*Taylor, Isaac E., M.D. Made Honorary Fellow, 1888.

Founder.—*Thomas, T. Gaillard, M.D. 1903.

1898.—Thompson, John T., A.M., M.D. Professor of Diseases of Women, Bowdoin School for Medical Instruction; Surgeon to the Maine General Hospital. 211 State Street, Portland, Maine.

Founder.—*Trask, James D., M.D. 1883.

1879.—†Underhill, J. W., M.D. 1886.

Founder.—Van de Warker, Ely, M.D. Surgeon to the Central New York Hospital for Women; Surgeon to the Syracuse Woman's and Children's Hospital. *Council*, 1885, 1889, 1896. *Vice-President*, 1889. *President*, 1901. 104 Fayette Park, Syracuse, N. Y.

1897.—Vineberg, Hiram N., M.D. Attending Gynecologist to St. Mark's Hospital; Gynecologist to Mt. Sinai Hospital Dispensary; Gynecologist to the Montefiore Home for Chronic Invalids. 751 Madison Avenue, New York.

1903.—Wakefield, W. Francis B., M.D. 1525 Sutter Street, San Francisco.

Founder.—*Wallace, Ellerslie, M.D. 1885.

1891.—Wathen, William H., A.M., M.D., LL.D. Pro-

fessor of Abdominal Surgery and Gynecology in the Kentucky School of Medicine; Ex-President of the Section on Obstetrics and Gynecology of the American Medical Association; Ex-President of the Kentucky State Medical Society; Fellow of the Southern Surgical and Gynecological Society; Gynecologist to the Louisville City Hospital and to the Kentucky School of Medicine Hospital. 628 Fourth Avenue, Louisville, Ky.

1896.—Watkins, Thomas J., M.D. Attending Gynecologist to St. Luke's, Lakeside, and Provident Hospitals, Chicago; Consulting Gynecologist to Silver Cross Hospital, Joliet, Ill.; Clinical Instructor in Gynecology, Northwestern University Medical School. 3564 Grand Boulevard, Chicago.

1898.—Webster, J. Clarence, B.A., M.D. (Edin.), F.R.C.P.E. Professor of Obstetrics and Gynecology, Rush Medical College, University of Chicago; Fellow of the Royal Society of Edinburgh; Fellow of the Edinburgh Obstetrical Society; Corresponding Member of the Royal Academy of Palermo, Italy, and of the Italian Obstetrical and Gynecological Society. 706 Reliance Building, 100 State Street, Chicago.

1902.—Wells, Brooks H., M.D. Professor of Gynecology in the New York Polyclinic Medical School and Hospital; Consulting Surgeon to the Brattleboro Memorial Hospital, Brattleboro, Vt. 523 Madison Avenue, New York.

Founder.—*White, James P., M.D. 1881.

1892.—Williams, J. Whitridge, A.B., M.D. Professor of Obstetrics, Johns Hopkins University; Gynecologist to Union Protestant Infirmary. *Council*, 1899. *Vice-President*, 1904. 1128 Cathedral Street, Baltimore.

1887.—*Wilson, Elwood, M.D. 1889.

Founder.—*Wilson, Henry P. C., M.D. 1898.

1886.—Wylie, W. Gill, M.D. Professor Emeritus of Gynecology, New York Polyclinic Medical School and Hospital; Gynecologist to Bellevue Hospital; Consulting Surgeon to the Methodist Episcopal Hospital, Brooklyn; Fellow of the British Gynecological Society. 28 West Fortieth Street, New York.

Total, 97 Active Fellows.

MINUTES OF THE PROCEEDINGS

AT THE

THIRTY-THIRD ANNUAL MEETING

OF THE

AMERICAN GYNECOLOGICAL SOCIETY,

HELD AT

PHILADELPHIA, PA.,

MAY 26, 27 AND 28, 1908.

THIRTY-THIRD ANNUAL MEETING.

PHILADELPHIA, *May* 26, 27, 28, 1908.

The following members were present:

THOMAS A. ASHBY,	Baltimore.
WILLIAM EASTERLY ASHTON,	Philadelphia.
B. F. BAER,	Philadelphia.
WILLIAM H. BAKER,	Boston.
J. MONTGOMERY BALDY,	Philadelphia.
EUGENE BOISE,	Grand Rapids.
HERMAN J. BOLDT,	New York City.
J. WESLEY BOVÉE,	Washington, D. C.
LE ROY BROUN,	New York City.
B. BERNARD BROWNE,	Baltimore.
WALTER WILLIAM CHIPMAN,	Montreal.
JOHN G. CLARK,	Philadelphia.
CLEMENT CLEVELAND,	New York City.
EDWIN B. CRAGIN,	New York City.
THOMAS S. CULLEN,	Baltimore.
ANDREW F. CURRIER,	Mt. Vernon.
ERNEST W. CUSHING,	Boston.
FRANCIS H. DAVENPORT,	Boston.
EDWARD P. DAVIS,	Philadelphia.
ROBERT L. DICKINSON,	Brooklyn.
EDWARD L. DUER,	Philadelphia.
HUGO EHRENFEST,	St. Louis, Mo.
PALMER FINDLEY,	Omaha.
CARLTON C. FREDERICK,	Buffalo.
HENRY D. FRY,	Washington, D. C.
J. RIDDLE GOFFE,	New York City.
SETH C. GORDON,	Portland, Me.
EGBERT H. GRANDIN,	New York City.
CHARLES M. GREEN,	Boston.
PHILANDER A. HARRIS,	Paterson, N. J.
GEORGE T. HARRISON,	New York City.

Barton Cooke Hirst,	Philadelphia.
Phineas H. Ingalls,	Hartford.
George W. Jarman,	New York City.
Charles Jewett,	Brooklyn.
Joseph Taber Johnson,	Washington, D. C.
Howard A. Kelly,	Baltimore.
Albert F. A. King,	Washington.
Florian Krug,	New York City.
Malcolm McLean,	New York City.
Walter Porter Manton,	Detroit.
Richard B. Maury,	Memphis.
Edward E. Montgomery,	Philadelphia.
William E. Moseley,	Baltimore.
Robert A. Murray,	New York City.
Franklin Spilman Newell,	Boston.
Charles P. Noble,	Philadelphia.
Richard C. Norris,	Philadelphia.
Charles B. Penrose,	Philadelphia.
William M. Polk,	New York City.
Edward Reynolds,	Boston.
Hunter Robb,	Cleveland.
Frank Farrow Simpson,	Pittsburg.
A. Lapthorn Smith,	Montreal.
Richard R. Smith,	Grand Rapids.
Isaac S. Stone,	Washington, D. C.
Howard C. Taylor,	New York City.
John T. Thompson,	Portland, Me.
Hiram N. Vineberg,	New York City.
Brooks H. Wells,	New York City.
J. Whitridge Williams,	Baltimore.
W. Gill Wylie,	New York City.

HONORARY FELLOWS.

Dr. William Gardner,	Montreal.
Dr. A. Martin,	Berlin, Germany.
Dr. J. Pfannenstiel,	Kiel, Germany.

FIRST DAY.—*Tuesday, May* 26, 1908.

Morning Session.—The Society met in the Assembly Hall of the College of Physicians, Philadelphia, and was called to order at 10 A.M. by the President, Dr. J. Montgomery Baldy, of Philadelphia.

Dr. Edward L. Duer, of Philadelphia, was introduced, and delivered the following

ADDRESS OF WELCOME.

MR. PRESIDENT AND FELLOW MEMBERS: I am here by order of our distinguished President to voice the welcome of the Philadelphia contingent to our visiting members and others who honor us by their interested presence here today. This "lies easily to hand." It gives me the more pleasure that I feel I am not doing violence to my authority in assuring you that this greeting is shared as well by the Philadelphia Obstetrical Society and the large body of Philadelphia Physicians and Surgeons, who are more or less immediately interested in your scientific proceedings.

It seems eminently fitting that we should meet in this city and in this room, consecrated by so many of the great men who gave their presence and influence to your initial meeting in Boston in 1876. Atlee, Drysdale, Goodell, Parvin, Penrose, Wallace, and A. H. Smith. Each one gave a good account of himself in life, and with one exception, has passed over the great divide. It becomes us to pause now and then and drop a tear to the memory of these great men. They and those who were with them, and those who have succeeded them have ever shown the saving gift of directness of purpose and devotion to a high conception of duty in their recognition of the compelling appeal of the great work. Probably no other specialty in medicine has to its credit, so many years added to life, and so much amelioration of human suffering as has gynecology in the last half century. "It is the duty of each generation to gather up the inheritance of the past, to serve the present, and prepare better things for the future." So far we have made good.

Few of you remember, many of you perhaps never knew, that abdominal section had its bitter fight fought out in this city. Previous to the time of the publication of Dr. Ephraim McDowell's first operation in the back woods of Kentucky in 1809 the surgical invasion of the traditionally sacred rights of the peritoneum was regarded by the medical profession as nigh unto criminal. I recall the vituperative attacks in hall and press, and a pamphlet on Dr. Washington Atlee when he proposed an abdominal operation for an ovarian cyst in a colored woman in this city. One of the writers, a distinguished medical practitioner, went so far as to assert that he should be tried for murder did the operation result disastrously. Happily it was a success, and Dr. Atlee lived to perform 387 ovariotomies, and to know that there was no considerable town in the whole United States without one or more abdominal surgeons. It is no reflection on those who have gone before and blazed the path through the wilderness of ignorance and superstition, but it is conceded by the world of medical men, that it remained for Drs. Washington and John L. Atlee to place this operation on an acceptable and scientific basis.

But time waneth apace, and it is not to be forgotten that we are here to drive business and pleasure tandem. A good team. The sturdy shaft horse is the raison d'etre of our existence, but the showy leader serves no unimportant function. "Meat maketh men forget their differences." I take off my hat to the man who cultivates a proper admixture of these activities. He is "nigh unto the Kingdom." Some of the most delightful relations of our professional life have been born and fostered around the festive boards of our visiting colleagues in the various cities of our country; allow me to assure you of our cordial desire to return, in kind, these enjoyable attentions that it has been our pleasure to have thus received. We place all that is ours to give, or yours to receive, at your disposal. I repeat my heartfelt welcome.

Response by Dr. William M. Polk.

Mr. President and Fellow Members of the American Gynecological Society: It is your own kindliness, Mr. President, in recognizing the fact that you are in your

own home that this pleasing function of responding to the address of welcome has been delegated to some other one than yourself. The situation is merely this, that a member of the Society is expected to return thanks to Dr. Duer for the cordial invitation which he has extended to us. It is needless to say, that the Doctor represents in his own person that kindliness of disposition and that true gentlemanly instinct that has always been characteristic of the men of this city. In extending to us so cordial an invitation he but places us under additional obligation to do our best to show our full appreciation thereof.

Speaking for the Society, I can simply say that Dr. Duer has recognized for himself and for the profession of Philadelphia an obligation which we ought as an organization and as men never to forget—that there is another side to our calling than that which is merely engrossing itself with the scientific. If there is one thing more than another which makes our gatherings pleasing it is the fact that we are gentlemen, and that we know how to behave toward each other as gentlemen; and when you get such an expression of cordial greeting as Dr. Duer has given us, I recognize that Philadelphia has risen to the full measure of the idea that we have always entertained of her and her professional body as being gentlemen among the gentlemen of the profession.

So far as the other aspect of the address is concerned, it is undoubtedly a tribute to this body as representing certain ideas which have in the past been largely advanced here by Philadelphians, her most celebrated men. It is needless for me to add more than to call your attention to what he has said in reference to Atlee and to the names of other men who have stood on this spot and have addressed the public at large, and particularly this and kindred societies, upon subjects which have engaged our attention. It is a tribute to us as well as to those who have preceded us; and if you will run over the list of the founders of this Society, you will see that they set a pace, that they established a standard, which, while it has ever been the purpose and intent of this Society to emulate, yet seems becoming for us to acknowledge. But, gentlemen, opportunity is after all a great thing in life, and we merely took from these gentlemen the brilliant results of the work which they had mapped out as

pioneers in an unexplored field, and I believe that upon the whole we have improved somewhat upon it. At any rate, I believe that with their shadows now looking down upon us they will realize we have not fallen from a good intent and a good purpose, and all that I can say is that while there are several most important questions yet before us for solution, chiefly those which relate to prophylaxis so far as septic conditions are concerned, particularly those of the venereal type, those which relate to the terrible affliction of blindness which yet afflicts innumerable people in consequence of neglect in our lying-in asylums, and that great question that looms up ever before us, namely, carcinoma, yet we have made inroads in the several directions that are worthy perhaps of our predecessors. Much is yet to be done. All I can say is that if we cannot, like them, win a great success so as to stand upon the mountain tops, we can at least try to deserve it. (Applause.)

The President.—The American Gynecological Society has with it today and as its guests several distinguished foreigners—men whose work has been known for many, many years the world over, whose prominence both as pioneer operators and for finished work is great; men of a nation whose blood flows in the veins, so to speak, of many of us and which gives us a much more kindred feeling possibly than otherwise would be the case. I refer to Dr. August Martin, of Berlin, and Dr. J. Pfannenstiel, of Kiel, Germany, the former an honorary member of this Society, the latter an invited guest. I welcome them in the name of the Society and hope they will enjoy the papers that are to be read and participate in the discussions upon them.

Dr. Martin said: I am delighted to be with you on this occasion, and I wish to thank you for the kind reception which you have extended to Dr. Pfannenstiel and myself. You elected me to honorary membership in your Society in 1888, for which again I thank you.

Nearly forty years ago it was my good fortune to meet and become acquainted with J. Marion Sims, Thomas Addis Emmet, and other distinguished American physicians, and since that time I have made the acquaintance of many others. I had the pleasure of attending a meeting of your

Society in 1887, and since then I have been desirous to come to America again. I am highly pleased to be with you today.

Since my last visit to this country Gynecology has made great progress, and judging from your program you will have a number of interesting papers. I look forward to the publication of your TRANSACTIONS with great interest, as I receive much instruction from your contributions. Again, gentlemen, I thank you. (Applause.)

DR. J. PFANNENSTIEL said: Although my friend Dr. Martin has mentioned my name and has thanked you in words much more fitting than I could have done, as I am not a master of your language, yet I wish to take this occasion to tender many thanks to you for your kind invitation. I thank you. (Applause.)

THE PRESIDENT.—We have with us the son of the illustrious Dr. August Martin, Dr. B. Martin, who will consider himself an invited guest of the Society.

The following were announced as invited guests, with the privilege of participating in the discussions: Dr. W. R. Nicholson, of Philadelphia; Dr. W. A. N. Dorland, of Philadelphia; Dr. J. A. McGlinn, of Philadelphia; Dr. P. Brook Bland, of Philadelphia; Dr. Geo. E. Shoemaker, of Philadelphia; Dr. Wilmer Krusen, of Philadelphia; Dr. I. Tracy, of Philadelphia; Dr. J. S. Bacon, of Camden, N. J.; Dr. J. C. Knipe, of Philadelphia; Dr. Edward E. Schumann, of Philadelphia; Dr. Wm. H. Wells, of Philadelphia; Dr. Mary Allen, of Philadelphia; Dr. Stricker Coles, of Philadelphia; Dr. Richard Woods, of Philadelphia; Dr. Edward Engle, of Philadelphia; Dr. Theo. B. Erek, of Philadelphia; Dr. Alex. McAllister, of Camden, N. J.; Dr. Geo. A. Peck, of New Rochelle, N. Y.; Dr. John O. Polak, of Brooklyn; N. Y.; Dr. A. H. Alexander, of Paterson, N. J.

SCIENTIFIC SESSION.

SYMPOSIUM: "Immediate *versus* Deferred Operation for Intra-abdominal Hemorrhage due to Tubal Pregnancy."

The following Fellows read papers on the above subject: Drs. Florian Krug, of New York; F. F. Simpson, of Pitts-

burg; Hiram N. Vineberg, of New York; E. E. Montgomery, of Philadelphia; C. C. Frederick, of Buffalo; Egbert H. Grandin, of New York; Walter P. Manton, of Detroit; A. Lapthorn Smith, of Montreal; B. F. Baer, of Philadelphia; and Herman J. Boldt, of New York.

The general discussion was opened by Dr. August Martin, of Berlin, and continued by Drs. Seth C. Gordon, E. W. Cushing, Hunter Robb, J. Wesley Bovée, Andrew F. Currier, Hugo Ehrenfest, J. Pfannenstiel, Brooks H. Wells, Joseph Taber Johnson, William Gardner, and the discussion closed by Drs. Smith, Baer, Grandin, Vineberg, Simpson, and Krug, after which the Society, on motion, adjourned until 2.30 P.M.

Afternoon Session.—The Society reconvened at 2.30 P.M., with the President in the Chair.

Papers were read as follows:

1. "The Heart in Shock," by Dr. Eugene Boise, of Grand Rapids, Michigan.

2. "Pernicious Anemia in Pregnancy," by Dr. Palmer Findley, of Omaha, Neb.

This paper was discussed by Dr. Richard C. Norris.

3. "Suggestions in Teaching Gynecology with the Demonstration of Special (Mechanical) Charts to Aid in This Work," by Dr. John A. Sampson, of Albany, New York.

Discussed by Drs. Martin, Goffe, and Maier.

4. "Hospital Gynecology," by Dr. Robert L. Dickinson, of Brooklyn, New York.

5. "Surgical Treatment of Prolapse of the Uterus and Bladder," by Dr. I. S. Stone, of Washington, D. C.

Discussed by Drs. Pfannenstiel, Goffe, Martin, Noble, and in closing by the essayist.

6. "Endometritis Exfoliativa," by Dr. Hugo Ehrenfest, of St. Louis, Mo.

7. "Operations for Relief of Pelvic Diseases in Insane Women, Including Four Hundred and Eleven Patients; Second Report," by Dr. Le Roy Broun, of New York.

This paper was discussed by Drs. Manton and Dickinson, after which, on motion, the Society adjourned until 10 A.M., Wednesday.

SECOND DAY.—*Wednesday, May* 27, 1908.

Morning Session.—The Society met at 10 A.M., and was called to order by the President.

The President announced the death of Dr. Gigli, of Genoa.

Symposium: "Intrapelvic (Subpubic) *versus* Abdominal Method of Dealing with Mechanical Obstruction to Delivery in Cases of Confinement."

Papers were read by the Fellows as follows: Dr. Richard C. Norris, of Philadelphia; Dr. Edward Reynolds, of Boston; Dr. Egbert H. Grandin, of New York; Dr. Barton Cooke Hirst, of Philadelphia; Dr. A. Lapthorn Smith, of Montreal.

On motion, the discussion of this symposium was postponed until after the delivery of the President's address.

At this juncture, the First Vice-President, Dr. I. S. Stone, took the Chair, and President Baldy delivered his address.

Vice-President Stone, on behalf of the Society, thanked the President for his forcible, instructive, and interesting address.

Dr. Boldt moved that that part of the President's address relating to the question of anesthesia be conveyed to all of the leading medical Journals in America, with the request by the American Gynecological Society that it be published in full, in order that the medical profession at large may consider the subject more seriously than it has heretofore.

This motion was seconded by several.

Dr. Vineberg moved as an amendment that that part of the address referring to anesthesia be printed in pamphlet form and furnished to the various Boards of Hospitals, in order that they may be able to read it.

The amendment was seconded and accepted, and the original motion as amended was put and carried.

The general discussion of the symposium previously referred to was opened by Dr. Edward P. Davis, and continued by Drs. Pfannenstiel, Fry, Jewett, Martin, Cragin, Murray, McLean, Green, Cushing, and the discussion closed by Drs. Smith, Grandin, Reynolds, and Norris.

On motion, the Association adjourned until 2.30 P.M.

Afternoon Session. The Society reconvened at 2.50 P.M., with the President in the chair.

8. Professor August Martin, of Greifswald, Germany, read a paper (by invitation) entitled "Development of the Technique of Gynecological Operations."

9. "Abdominal and Vaginal Celiotomy for Gynecological Operations; Their Indications and Technics," by Professor J. Pfannenstiel, of Kiel, Germany, by invitation.

These two papers were discussed together by Drs. Noble, Cleveland, Stone, Goffe, Boldt, Dickinson, Gordon, Kelly, Frederick, and the discussion closed by Drs. Martin and Pfannenstiel.

10. "The Condition of the Mucosa in Cases of Uterine Myomata," by Dr. Thomas Cullen, of Baltimore, Md.

Discussed by Dr. Clark.

11. "Some Further Experimental Work in Severing the Pelvic Vessels in Bitches, and its Bearing on Ruptured Ectopic Pregnancy," by Dr. Hunter Robb, of Cleveland, Ohio.

12. "Intra-abdominal Pressure," by Dr. Richard R. Smith, of Grand Rapids Michigan.

On motion, the Society went into Executive Session.

Business Meeting of the Society.

The Society met in Executive Session at 5.30 P.M. Wednesday, May 27, in the parlor of the Hotel Bellevue-Stratford, Dr. Baldy in the chair. A quorum was present. The minutes of the last meeting as recorded in the volume of TRANSACTIONS were presented by the Secretary and approved as printed. The Treasurer reported that there was an approaching deficit in the treasury to the amount of the expenses of the current meeting.

An Auditing Committee was appointed, consisting of Drs. Currier and Manton, who reported the accounts as correct. On motion of Dr. Boldt, an assessment of $5 per member was unanimously voted.

Communications from the Secretary. The Secretary announced that since our last meeting the Society had suffered loss by death of three of its Honorary Fellows, viz., Charles J. Cullingworth, of London, England; Robert Barnes, of London, England; and William T. Howard, of Baltimore; that Dr. Richard T. Maury, having served as Active Fellow for twenty-five years, had, by his request, been

placed on the list of Honorary Fellows; that Dr. Augustus H. Buckmaster had tendered his resignation from the Society by letter, which was read, no reason being given. By vote, the resignation was accepted and dues remitted; that Dr. John H. Musser, of Philadelphia, in a letter which was read, as Chairman of the American Committee of the International Medical Congress, which will hold its next session at Budapest, August 29 to September 4, 1909, requested that the Society select one of its members to set forth concisely and forcibly, in a paper to be presented at that meeting, what America had contributed since the last meeting of the Congress to the advancement of Gynecology and Obstetrics. On vote of the Society, the selection was left in the hands of the incoming President; that in the general session of the Society a motion had been made and carried that the recommendations regarding anesthesia in the President's address be printed in the prominent medical journals of the country and reprints be sent to the trustees or governors of all the prominent hospitals. The Secretary asked for instructions as to how many hospitals that meant, and was informed about one hundred. On motion, Dr. Edward Reynolds was elected delegate to the Executive Committee of the Congress of American Physicians and Surgeons, and Dr. J. Montgomery Baldy, alternate.

Reports of Committees. Dr. Dickinson, as Chairman of the Committee on Nomenclature, read an elaborate report, with recommendations, as follows:

Report of Committee on Nomenclature.

The Committee on Nomenclature, appointed at the last meeting, consisting of Drs. Dickinson, Bovée, and Williams, reports a most promising outlook for extensive united action. No classification can be authoritative that has behind it only a single society or even a single nation. No immediate results are possible, but an excellent list is available for present use.

After study of previous endeavors in this line, after many interviews and much correspondence, Dr. A. T. Bristow, of Brooklyn, was requested to move, at the meeting of the American Medical Association in Atlantic City in June,

that the President appoint a committee of five on Nomenclature and Classification of Diseases, said committee to coöperate with representatives from other bodies interested, in order to send a suitable delegation to the Paris Commission of 1909, which revises the International Classification of Causes of Death. This International Commission, however, your committee learns, is likely to postpone its meeting to 1910, and to alter the place to Washington. One of the ex-members of the American Gynecological Society, Dr. Frank P. Foster, was appointed Chairman of the American Medical Association Committee. Your committee was summoned to the meeting of the American Medical Association Committee. At that meeting it was shown that there is in this country no generally accepted standard of nomenclature. Various Government departments use widely different systems. England, Germany, and France all differ. Twenty-nine nations unite on the International Classification, sometimes called the Bertillon system, used by the Census Bureau and the French Government, but this is not up to date. The meeting inaugurated a plan to bring in touch all important American bodies, scientific and governmental, interested in nomenclature and classification of diseases, looking to the formulation of a list to be submitted for international action. The American Medical Association and its sections, the national societies making up the Congress of American Physicians and Surgeons, that meets every third year in Washington, the American Public Health Association, the Census Bureau, the Surgeon-General's office of the Army and Navy, and the Marine Hospital Service have been asked to work together. In order to begin to build on the best existing foundation, the meeting recommended, and the Chairman of the Association Committee requested each of the various bodies hereinafter listed, to start the work in its own department, based on a criticism of the *Nomenclature of Diseases of the Royal College of Physicians of London*, fourth edition, third revision, 1906. This gives us a very able and very complete work for immediate use in practice and in hospital indexing, which we, in using, may endeavor to improve.

Your committee recommends that the work to be undertaken by the American Gynecological Society in its own

special field be modelled on the methods of the anatomists, which resulted in the *Basle Anatomical Nomenclature*, published in English by Dr. F. Llewellyn Barker. Your committee asks for authorization to request a report from each member of this society, on the betterments he would suggest after study of matters bearing on Gynecology in the *Nomenclature of the College of Physicians of London*, dated 1906; such results then to be tabulated and a copy of the tabulated suggestions sent to each member for a second vote. It was found by the anatomists that after this second submission of lists the number of moot questions was narrowed down to a relatively small one, which could be further discussed conveniently and decided by a majority vote, or by special committee.

Your committee recommends, for temporary adoption, as our basis of Nomenclature of Diseases, the London nomenclature.

Your committee requests a moderate sum for the clerical work of collating returns and for printing and postage.

The committee reports further that for every-day use in hospital and office indexing a pocket edition or summary is deemed to be desirable. It recommends for such use (until further revision is effected) the *Nomenclature of Bellevue and Allied Hospitals of New York*. As the standard of the last five years in several hospitals, large and small, in New York and elsewhere, this epitome, which is largely based on the London nomenclature, has had a chance to prove itself of value. Dr. Polk is interested in the revision of the Bellevue Nomenclature, which is to appear in the autumn, in which he is represented by Dr. Studdiford. Your committee recommends that it be empowered to request that galley proofs be submitted to us by the Committee on Clinical Records of Bellevue Hospital, so that a copy may be sent to each of our members.

Advice has been had from Drs. Fletcher and Garrison, of the Surgeon-General's Library and *Index Medicus*. Dr. Achilles Rose, of New York, has, at his suggestion, been invited to act as Honorary Member of this Committee. We are greatly indebted for assistance and advice to the efficient and energetic head of the Department of Vital Statistics of the Census Bureau, Dr. Cressy Wilbur.

The committee would earnestly request each member of the society to procure a copy of the *London Nomenclature* (fifty cents each) and put it to practical test. This book has a very complete index; it contains a list of 1244 diseases and modes of injury, each with its Latin, German, and French equivalent expression, and accepted English synonyms; an appendix contains a classification of surgical operations, neoplasms, malformations, poisons, animal and vegetable parasites, and an enumeration of morbid states and processes used as the basis of arrangement of local diseases.

A list is subjoined of the Committee of the American Medical Association and of the Societies that have been asked to coöperate:

A. *Committee of Five, American Medical Association*, coöperating with Dr. Frank P. Foster, of New York; Dr. W. A. N. Dorland, of Philadelphia; Dr. J. C. DaCosta, of Philadelphia; Dr. Victor C. Vaughan, of Ann Arbor, Mich.

B. *Government Departments:*

1. Surgeon-General's Office, U. S. Army, Hospital Statistics.

2. Surgeon-General's Office, U. S. Navy, Hospital Statistics.

3. Public Health and Marine Hospital Service, Hospital Statistics; and also charged with the collection of morbidity statistics for the entire United States.

4. Bureau of the Census (Division of Vital Statistics). Mortality statistics for entire United States, as far as obtainable by registration.

C. *Sections of the American Medical Association:*

1. Practice of Medicine.
2. Obstetrics and Diseases of Women.
3. Surgery and Anatomy.
4. Hygiene and Sanitary Science.
5. Ophthalmology.
6. Diseases of Children.
7. Stomatology.
8. Nervous and Mental Diseases.
9. Cutaneous Medicine and Surgery.
10. Laryngology and Otology.
11. Pathology and Physiology.

D. *Congress of American Physicians and Surgeons:*

1. American Ophthalmological Society.
2. American Otological Society.
3. American Neurological Association.
4. American Gynecological Society.
5. American Dermatological Association.
6. American Laryngological Association.
7. American Surgical Association.
8. American Climatological Association.
9. Association of American Physicians.
10. American Association of Genito-urinary Surgeons.
11. American Orthopedic Association.
12. American Pediatric Society.
13. American Medico-Psychological Association.
14. American Association of Pathologists and Bacteriologists.

E. *Other National Organizations:*

1. National Association for the Prevention and Study of Tuberculosis.

2. American Public Health Association, Section of Official Registrars of Vital Statistics, etc.

Dr. Howard A. Kelly, Chairman of the Committee on Moral and Sanitary Prophylaxis, reported progress, with the recommendation that each Fellow further as far as possible the work of the American Society of Sanitary and Moral Prophylaxis.

Dr. Ashby, for the committee on place of meeting and program for the centennial anniversary of McDowell Ovariotomy, advised holding the meeting at Louisville, with excursion to Danville, or at Danville. This was not approved, and a substitute motion that the meeting of 1909 be held in New York City was carried.

Dr. Harris, chairman of the Committee on Revision of Constitutions and By-laws, reported and presented the following changes or amendments: Paragraph 3, Section III, of Constitution, to read as follows: The Honorary Fellows shall not exceed ten American, exclusive of those who have been Fellows of the Society, and twenty-five foreign. Second sentence of Paragraph 4, Section III, shall read as follows: Each candidate shall send nine copies of his thesis to the Secretary of the Society not later than April 1, on a subject

connected with gynecology or obstetrics or abdominal surgery. Third line from bottom of page of Paragraph 4, Section III, of the Constitution to read: "On or before April 1 prior to any succeeding annual meeting," in place of a month before any succeeding annual meeting. Add to Paragraph 1, Section II, By-laws, And when not in session shall perform its business by correspondence. Section 5, substitute for "the fourth Tuesday in May," "at a date to be determined by the Council." The report was accepted and the Committee discharged.

Dr. I. S. Stone moved, in addition, the following amendment in line six, Paragraph 4, Section III, of the Constitution: Substitute for "Unpublished Paper," "Original Unpublished Thesis which shall not have been previously read or presented by title before any society."

Report of Council. The Council nominated for Honorary Fellowship Professor Dr. J. Pfannenstiel, of Kiel, Germany. A ballot was taken, which was announced as unanimous in his favor. Of the six candidates, the Council recommended Dougal Bissell, John Osborn Polak, and Franklin H. Martin for election. The three candidates recommended were severally elected by ballot.

The Society proceeded to election of officers for the ensuing year, with the following result:

President—Dr. J. Riddle Goffe, of New York.

First Vice-President—Dr. Howard A. Kelly, of Baltimore.

Second Vice-President—Dr. Malcolm McLean, of New York.

Treasurer—Dr. J. Wesley Bovée, of Washington, D. C.

Secretary—Dr. LeRoy Broun, of New York.

Member of the Council, to take the place of Dr. Richard B. Maury, George Tucker Harrison; additional member of the Council, Dr. J. Montgomery Baldy.

On motion of Dr Harris, the Council was authorized to incur the usual expenses for printing and distributing the volume of TRANSACTIONS for 1908.

Adjourned.

THIRD DAY.—*Thursday, May* 28, 1908.

Morning Session. The Society met at 10 A.M., and was called to order by the President.

13. "Vertical and Horizontal Amputation of the Uterus," by Dr. Howard A. Kelly, of Baltimore.

Discussed by Drs. Martin, Pfannenstiel, Boldt, Wylie, Gordon, Goffe, A. Lapthorn Smith, Stone, Grandin, Frederick, and the discussion closed by Dr. Kelly.

14. "Ventrosuspension: An Unsafe Operation for Posterior Displacements of the Uterus during the Child-bearing Age," by Dr. Edwin B. Cragin, of New York.

Discussed by Drs. Williams, Norris, Davis, Fry, Wylie, Gordon, and in closing by the author of the paper.

15. "Is Pubiotomy a Justifiable Operation?" By Dr. J. Whitridge Williams, of Baltimore.

This paper was discussed by Drs. Grandin, Pfannenstiel, Davis, Murray, Hirst, Fry, Norris, and in closing by Dr. Williams.

At the conclusion of the reading of the last paper the retiring President, Dr. Baldy, said: The time has come to close the thirty-third annual session. Since taking the President's Chair I have realized more or less the words of Scripture, as quoted by A. Lapthorn Smith, that, "Man is born of trouble." In retiring from the President's Chair, I would like to call attention to one or two features. At this session especially our effort has been to make the program so attractive as to hold the members and make the final session as successful as any of the others, such as we have not had for many many years. I do not know of any session on the third day of our meeting that has been as pleasant and successful as this one. (Applause.) I hope this demonstration will hold the Society in good stead in the future, and that it will be one of the features of future meetings.

I wish to thank you for your forbearance. Of course, in electing me as your President, you knew perfectly well that hard and fast rules would be followed in the conduct of the business, and you have not been disappointed. I have striven to obtain the best possible result. I stood against

the transference from one part of the program to another, and in each case I found willing acquiescence on part of the applicant. I have tried to hold you strictly to your discussions, and the results have amply justified the situation.

In retiring, I take great pleasure in handing you over to the tender mercies of our former Secretary and President-elect, Dr. Goffe, and place you and your future in his hands. (Applause.)

The President-elect, Dr. Goffe, said:

Members of the American Gynecological Society, Fellow Workers, and Dear Friends: In laying down the duties of Secretary, and assuming those of my new position, it may not be inadvisable to review a little the work of the Secretary. At the time I was placed in the responsible position of Secretary there were rumors in the air that gynecology was passing. The idea at once presented itself that the health of the American Gynecological Society must inevitably be the index of the health of our specialty, and if it were possible in any way to make the work of the Society in its scientific aspect more aggressive, more positive, more convincing to the profession at large, the possibility lay in the presentation from year to year of the most advanced thought and work of our members. Working along these lines, with the active, cordial coöperation of the Council, the programs have been arranged in a way to emphasize that idea, and, as I believe, with telling effect.

The office of Secretary has been a great school for the occupant of that position. In order to arrange the program and bring out the best that we have, it became necessary to classify the members, to get a line upon the special individual work of the different Fellows, to know where to place them, and how to get the best results.

It has also been a great training in the matter of tact and diplomacy. Great men, as we all know, have eccentricities. And in this galaxy of great men it is not to be expected that such characteristics will be entirely absent. A secretary has to meet these with the best tact he can summon. So far as I am aware, no serious unpleasantness has at any time occurred. We have gone along in a most peaceful way. Indeed, I have got to feel that if this Society

were organized simply for the purpose of good fellowship and friendly feeling, nothing could be more perfect.

In taking up the new position of President of the Society, I cannot express to you how grateful I am for the honor conferred. If fulfils my fondest dream and satisfies my ambition to the fullest degree.

There is one consideration I wish to present to you in which it seems to me the influence of the Society can be more effectually exerted, and that is in crystallizing, so far as we can, the conclusions from such discussions as we have had at this meeting. It is a difficult thing to do, but if the Society could constitute itself a jury to consider the evidence and render a decision that could go out as the judgment of the Society upon the question involved, it would carry great weight in shaping professional conviction and custom. In exercising the prerogative of President I propose to appoint two committees, one to consider each of the symposia presented at this meeting, asking the members of the committees to draw conclusions which, in their judgment, are logical from the facts stated, and present them at the next meeting for adoption by the Society.

The coming meeting will be the celebration of the centennial of the first ovariotomy done in this country, and it will be largely a *résumé* of the history of that operation, and its effect upon the development of gynecology. I shall endeavor to arrange the program very prominently with that object in view, and I bespeak your cordial coöperation in carrying out that idea.

I trust that the Great Reaper will find no harvest in our midst during the coming months, and that you will all enjoy the best of health and an assured return to our meeting in New York a year from this time. (Applause.)

Professor Pfannenstiel thanked the Society, as an honorary member, for the courtesy that had been shown him, and congratulated the members on the very successful meeting they had had.

There being no further business, the Society, on motion, then adjourned *sine die*.

J. RIDDLE GOFFE,
Secretary.

CONSTITUTION.

I. This Society shall be known as the AMERICAN GYNECOLOGICAL SOCIETY.

II. The object of this Society shall be the promotion of knowledge in all that relates to the Diseases of Women, to Obstetrics, and to Abdominal Surgery.

FELLOWS.

III. The Fellows of this Society shall consist of Fellows and Honorary Fellows.

The Fellows shall not exceed one hundred in number.

The Honorary Fellows shall not exceed ten American and twenty-five foreign.

Candidates shall be proposed to the Council, by two Fellows *only*, at least one month before the first day of the meeting, each nomination being accompanied by a list of the principal publications of the candidate and of the official positions which he holds. Each candidate shall submit to the Council at least one month before the first date of meeting an unpublished paper upon some subject connected with gynecologic or obstetric science, and on nomination by the Council shall be balloted for at the annual meeting. A two-thirds affirmative vote of all the Fellows present shall constitute an election, at least fifteen Fellows being present. The names of any candidates not nominated by the Council or not elected by the Society shall be placed upon a waiting list and shall be reconsidered by the Council at each succeeding meeting. When the name of the candidate is placed upon the waiting list a copy of his paper shall be returned to him for publication if he so desires, but any such candidate shall have the privilege of submitting another paper to the Council a month before any succeeding annual meeting. A list of all the candidates, accompanied by all the information sent to the Council, shall be sent to every Fellow with the notification of the annual meeting.

No one shall be eligible for Active Fellowship until he shall have submitted to the Council a paper on some subject connected with gynecologic science.

HONORARY FELLOWS.

IV. The power of nominating Honorary Fellows shall be vested in the Council.

The election shall take place in the same manner as that of ordinary Fellows.

They shall enjoy all the privileges of other Fellows, but shall not be required to pay any fee or be allowed to hold any office, or to cast any vote.

Any member of this Society at the end of twenty-five years' active service in the Society, or at any time thereafter, at his own request, shall be placed on the roll of Honorary Fellows, and shall be so classified in the next volume of TRANSACTIONS, provided the request be made during the fiscal year for which the annual dues have been paid by that member.

OFFICERS.

V. The officers of the Society shall be a President, two Vice-Presidents, a Secretary, and a Treasurer, all to be elected annually, who, with four other Fellows, one to be elected each year for a term of four years, shall constitute the Council of the Society.

The nomination of all officers shall be made in open session at the business meeting, and the same shall be elected by ballot.

The officers shall enter upon their duties immediately before the adjournment of the meeting at which they were elected, and shall hold office for one year.

Any vacancy occurring between the annual meetings shall be filled temporarily by the action of the Council.

All officers shall be eligible for re-election.

ANNUAL MEETING.

VI. The annual meeting of the Society shall be held regularly on the fourth Tuesday in May, and shall continue for three days, unless otherwise ordered by vote of the Society at any executive session.

AMENDMENTS.

VII. This Constitution may be amended by a two-thirds vote of all the Fellows present at an annual meeting, provided that notice of the proposed amendment has been given in writing at the annual meeting next preceding, and that the same has been printed in the notification of the meeting at which the vote is to be taken.

BY-LAWS.

PRESIDENT AND VICE-PRESIDENTS.

I. The President and Vice-Presidents shall discharge the duties belonging to their respective offices. The President shall be *ex-officio* chairman of the Council.

SECRETARY.

II. The Secretary shall attend and keep a record of all the meetings of the Society and of the Council, of which latter he shall be *ex-officio* clerk.

At each annual meeting he shall announce the names of all who have ceased to be Fellows since the last report.

He shall superintend the publication of the TRANSACTIONS, under the direction of the Council.

He shall notify candidates of their election to Fellowship.

He shall send notifications of the annual meetings and of the meetings of the Council.

TREASURER.

III. The Treasurer shall receive all moneys due and pay all debts. He shall render an account thereof at the annual meeting, when an Auditing Committee shall be appointed to report.

COUNCIL.

IV. The Council shall meet as often as the interests of the Society may require.

Five members shall constitute a quorum.

It shall have the management of the affairs of the Society, subject to the action of the Society at its annual meetings.

It shall arrange the order for the reading of papers at the annual meetings.

It shall not have power to make the Society liable for any debts exceeding in total one hundred dollars in the course of any one year, unless specially authorized by a vote of the Society.

It shall have the entire control of the publications of the Society, with the power to reject such papers or discussions as it deems best.

The President, or any three members, may call a meeting, notice of which shall be transmitted to every member two weeks previous to the meeting.

The Council shall determine questions by vote, or—if demanded—by ballot, the President having a casting vote.

The Council shall constitute a Board of Trial for all offences against the Constitution and By-laws, or for conduct unbecoming an honorable physician, and shall have the sole power of moving the expulsion of any Fellow.

ORDER OF BUSINESS.

V. The Order of Business at the annual meetings of the Society shall be as follows:

I. General meetings at 10 A.M. each day.
   1. Reports of the Committees.
   2. Reading of Papers and Discussion of the same.

II. The Business Meeting, at which only Fellows of the Society shall be present, shall be held on the second day of the session, at an hour determined by the Council and announced on the program of the meeting. The Secretary's Record shall then be read; the Treasurer's accounts be submitted; the reports of Committees or other than scientific subjects be received; and all miscellaneous business be transacted.

PAPERS, ETC.

VI. The titles of all papers to be read at any annual meeting shall be forwarded to the Secretary not later than *two weeks* before the first day of the meeting.

No paper shall be read before the Society which has already been printed or has been read before another body.

All papers that may be read before the Society, and accepted for publication, shall become the property of the Society, and their publication shall be under the control of the Council. Such papers may be published in full in medical journals, provided that they are also printed in the TRANSACTIONS.

QUORUM.

VII. A quorum for business purposes shall be fifteen Fellows.

DECORUM.

VIII. No remarks reflecting upon the personal or professional character of any Fellow shall be in order at the annual meetings, except when introduced by the Council.

ASSESSMENTS.

IX. Every Fellow shall pay in advance the sum of fifteen dollars annually.

Any Fellow whose subscription shall be more than nine months in arrears shall be reminded of the fact by the Treasurer in writing; in event of payment not being then made, he may, on vote of the Council, be dropped from the Society.

Each Fellow shall pay on admission an initiation fee of twenty-five dollars.

Any Fellow who shall neither attend nor present a paper for three successive years shall, unless he offers an excuse satisfactory to the Society, be dropped from Fellowship.

AMENDMENTS.

X. Any of these By-laws may be amended, repealed, or suspended by a two-thirds vote of the Fellows present at any meeting, *provided* previous notice in writing has been given at the annual meeting, immediately preceding the one at which the vote is to be taken.

PAPERS

READ AT THE

THIRTY-THIRD ANNUAL MEETING

OF THE

AMERICAN GYNECOLOGICAL SOCIETY,

HELD AT

PHILADELPHIA, PA.,

MAY 26, 27 AND 28, 1908.

THE PRESIDENT'S ADDRESS.

THE GENERAL ADMINISTRATION OF ANESTHETICS.

By J. M. Baldy, M.D.,
Philadelphia.

It is with profound regret that I have officially to announce to you the death during the past year of two of our honorary fellows, Dr. Robert Barnes, of London, England, and Dr. William T. Howard, of Baltimore, Maryland; the former one of the earliest guests of this Society after its organization, the latter a Founder member and an ever-active participant in your meetings. In the death of William T. Howard we have lost one of the landmarks of our Society, one of the links of the past—a loss for which we are all equally grieved.

In this connection it were well to remind you that in the process of evolution we are rapidly having our ranks depleted by the death of our oldest and most tried members. But few of our Founder members remain with us, and these few are rapidly advancing in years. No organization can long stand such a drain and remain preëminent in its chosen field without replenishing its ranks with the best of the younger generation. It would seem that a systematic policy might with advantage be adopted by you, one which will keep your ranks from being completely filled so as to always have a place for *the* man when he appears; one which will studiously consider

primarily an applicant's scientific attainments and fully establish these before allowing his qualities of good fellowship to warp your judgment. And, as a secondary matter, might it not be well to avoid a too great concentration of strength in any one locality? It would appear that your membership on the Atlantic seaboard is too largely predominant and that other sections of this great country should be more fully represented.

In presenting this your presidential address, it would appear proper to discuss with you general policies, advances, and failures of the past and the duties of the future rather than to devote the time to a scientific paper. The objects of societies in general, of this Society in particular, are of a mixed character, scientific and social. The social side brings men together, gives opportunity for personal contact and estimate of personal worth, and no better way exists of discovering an individual's professional capacity than to become acquainted with his methods of thought, accuracy of observation and process of reasoning as applied to those every-day affairs with which everyone, scientist or layman, is equally well acquainted and of which he is equally competent to judge. In this way in a large measure are we able to form a fairly correct idea of one's professional ability, especially when the knowledge thus acquired is added to the analysis of his scientific papers and discussions. In this way are we measurably able to estimate the worth of his writings and his professional opinion. A man's enthusiasm, his seriousness, his belief in himself and his logical defence of his position, although perhaps differing from one's own, cannot fail to impress the observer as to his ability and his honesty; the true worth of a man is rarely underestimated by his immediate associates and peers; here he soon finds his proper level. The social side of an association's meetings has therefore more of value than at a superficial glance would appear, and it would seem that rather than depart

one iota from the high standard of the past as set by our Society, we should view with pride the efforts expended in this direction and should continue in the future to develop this side of our meetings even more, if that were possible, than in the past.

The scientific side of our meetings has from the organization of the Society been of a very high standard and the transactions of this body contain about all that is known or worth knowing in the gynecological and obstetrical arts. It has been from time to time the effort of various organizations similar to our own so to conduct their meetings as to bring out the best results both as to papers and discussions. With this thought in mind in 1904, your President, Dr. Reynolds, in his presidential address suggested the establishment of fixed discussions with a series of papers limited as to time followed by discussions of a similar character. In consequence of this suggestion you have had a program which has occupied the mornings of the first two days with a symposium of subjects previously selected by your Council. This departure from the past has had its advantages but has also had its disadvantages. It has a tendency to develop short abstract papers as against fuller and more scientific ones. It occupies the two most important sessions of your meetings; on the second day it interferes with your presidential address (which is fixed at a stated time), and your President's address interferes most materially with the symposium. No paper or series of papers receives the same thoughtful and thorough consideration in a discussion which is interrupted by a subject foreign to its import as does one which is continuous. The symposium feature is a valuable one and should be continued, but were it not well at this time to recast the lines and modify it to the extent of one symposium day or, if two be still considered desirable, to confine the days to the first and last of the meeting? If this were done a session which is generally a broken one and one

more or less of failure on account of the departure of members for home on the last day, might be rendered equally as important as the others and would have the additional advantage of leaving your second day open exclusively to well-developed scientific papers and with no interference with your presidential address. These thoughts are offered for your consideration and matured judgment and for the action of your Council.

In looking over the field of our endeavors for the past year I find nothing new advanced nor any startling improvements on the old. After a decade of obstetrical and gynecological activity unprecedented in any branch of medicine we seem like wise men to be resting, retrospecting and putting our house in perfect order before proceeding farther. Notwithstanding this the signs for the future are bright, and when we note on the one hand the activity of the obstetrical world in that great undertaking, the prevention of blindness at the beginning of life and the activity of the gynecological world in the fight against that greatest of all scourges of middle life, cancer, we may look with complacency upon the criticism which has predicted the end of our branch of medicine as a specialty. In fact, after having developed the basic principles of everything known in abdominal surgery, and having made it possible by our pioneer work for the general surgeon to develop what little good he is responsible for in visceral surgery, we may even yet develop a field common to us both the vast importance of which has been only too long neglected by all—anesthesia.

The general administration of anesthetics as performed today is the shame of modern surgery, is a disgrace to a learned profession; and if the full unvarnished truth concerning it were known to the laity at large it would be but a short while before it would be interfered with by legislative means—and properly so. In the traditions of our profession the poor receive as good service as the rich; so in the matter

of anesthetics is this true only with this difference: in the first instance they both receive the best that is in us; in the latter they both receive the worst. Who of you is not familiar with the patient coming for a possible operation whose one dread is the approaching anesthetic—a dread born of a past personal experience or the experience of a friend? Who of you is not familiar with the terrible struggle for breath so common to the etherizing room of the past; the congested, blackened face; the prolonged anesthesia; the patient only partly relaxed; the delay in the operation; the difficulties of the manipulation after an operation begun; the heart sickness at a difficult and delicate operation made doubly and trebly so from the unnecessary chances of sepsis, hemorrhage, and shock; the feeling of a patient lost from no lack of skill of your own; the slipping of a ligature and a secondary operation or death; the immediate death on the table from failure of the heart; drowning due to inspired sputum; the vomiting on the operating table, to the detriment of the operation; the prolonged after-period of nausea and vomiting, to the great suffering and misery of the patient; the inspiration pneumonias and other pulmonary complications; the nephritis and urinary suppressions—all due in great part to faulty anesthesia? How many deaths at the time of the operation, shortly after operation, or some days or weeks later, are due to the same cause? What relation does the anesthetic bear to the large group of pulmonary complications reported from so many different sources and what is its relation to the thromboses and embolisms which have in the past caused so much suffering and disaster? What of the fatty degenerations of the liver, heart, and kidneys? Who can tell? This fact is certain, however: more deaths following operations are due directly and indirectly to the administration of the anesthetic than the profession in the past has dreamed of. Wherein lies the fault, and where is the remedy? The present long-established and time-honored custom of having the anes-

thetic administered in hospitals by the resident physicians, in private homes by any available doctor in the neighborhood, is to be condemned. The man who is able and ready to pay any amount of money for the services of the most skilful surgeon available has his life and those of his family unknowingly put at the mercy of a boy just from his books, with absolutely no practical knowledge of anesthetics and with less teaching. One has only to recall his own experience and feelings during the first few weeks of his apprenticeship at anesthesia to realize how thoroughly at the mercy of chance was the survival of the patient and how utterly helpless he would have been had anything gone wrong. Is it an exaggeration then to call such a condition a disgrace to the profession of medicine?

Who is to blame for this state of affairs? The young men to whom the anesthetic is relegated? By no means. As a rule they are a hard-working, well-meaning and enthusiastic body of men, eager for knowledge and faithful to every trust. The anesthetic is placed in their hands and they do the best they know how, and are in no way to be blamed if, although ignorant and inexperienced, they are placed in a position of trust in the operating room second in importance only to that of the surgeon. Are hospital managers at fault? It would seem not. They accept the customs of the past as they find them, and if the medical men on whom they depend for instruction in medical matters are so derelict in their observation, knowledge, and duty as to remain content, who can find fault with the hospital management? Who, then, is at fault in this most grave matter? We, ourselves, gentlemen, and we alone, members of the medical profession. We have remained too long bound by the traditions of the dark ages of surgery; we have so devoted our attention to the discovery of new operations and to the development of their technique that we have too long forgotten one of the most vital points in our operating rooms. Unless we arise shortly to the im-

portance of this reform ourselves, an awakened public opinion will take charge of the matter and legislate us into a safer position. Fortunately the reform is in sight. Occasionally we hear an isolated voice raised against the continuation of this state of affairs a protest which is lost in the general activities of professional life. In a few bright spots we see an effort made to reform with an isolated hospital here or there employing a salaried anesthetizer. And herein lies the remedy—a salaried anesthetizer in each and every hospital in the land with a salary of sufficient size to attract to the service men of proper intelligence.

Dollars and cents will be an important item in the success of this movement, and a sufficient sum to entice a young man of brains for any great number of years away from a full professional life with all its rewards will be found difficult to raise. Fortunately, however, woman offers a solution to the problem. The qualities of a woman are just those requisite to quiet and soothe a frightened or timid patient approaching the anesthetic, and she is the better qualified to devote her whole attention to her work from the fact of her having no ambition to do surgery and therefore having less incentive to neglect her anesthetic in order to watch the manipulation of the surgeon. In addition, is not her very timidity an advantage in that it makes her realize more fully her responsibilities and keeps her more attentive? And, finally, an amount of salary which will prove attractive and permanently remunerative to her would be no temptation to a physician who had the fuller field of professional remuneration ahead of him should he prove a success. Women have been tried in this capacity with the greatest success, and the matter is beyond the experimental stage. Many brainy women fully capable of being trained to this responsible position have entered the nursing profession, and it is from this source we may look for a solution of our difficulties. Women are being tried and are proving most satisfactory as anes-

thetists, and it will be a bright day of advance in the technique of the operating room when their services are more generally adopted. It is only those of us who have been so fortunate as to have at our service a skilful and competent anesthetizer who can fully appreciate the difference in results as to the satisfaction of doing our work, the celerity and safety of its execution, and the comfort and safety of the patient both during and after the operation. It behooves the medical profession to arouse itself to the importance of this reform before the public fully realizes the situation and takes the matter into its own hands. And it is befitting us as a scientific and surgical body to once more take the lead and point out to the surgical world the way to the one great reform remaining in the perfection of our technique.

It only remains for me to express to you my gratitude for the appreciation you have shown of my past interest in our common association by making me your President. It has been one of the ambitions of my professional life to hold this honor, the greatest in your power to bestow, and one which will for all time be worthy the ambition of any man. And it will always be a matter of intense pride with me to remember the fact that you have deigned to associate me with the names of such distinguished men as have presided over your deliberations in the past—Fordyce Barker, Peaslee, Gaillard Thomas, Sims, Emmett, Kimball, Albert Smith, Goodell, and many others—immortals of a great and recent past!

IMMEDIATE *VERSUS* DEFERRED OPERATION FOR INTRA-ABDOMINAL HEMORRHAGE DUE TO TUBAL PREGNANCY.

By Florian Krug, M.D.,
New York.

In accepting the request of the Council to open the discussion on this most important question, I realize not only the great honor bestowed upon me, but also the grave responsibility thereby involved. The Council in its preliminary circular expressed the hope that those writing papers on the subject should not take too strong a partisan view, unless conviction inspired it in the interest of the patient. This injunction is eminently proper when we consider that while our remarks are made before a jury of peers ready to cope with any emergency, they are bound to reach the busy general practitioner and will formulate for him a standard of rules, which may have to guide him perhaps in the middle of the night, more or less unprepared, with a human life and the happiness of an entire family at stake.

Based on a large and varied experience, I shall endeavor to convey my thoughts to you *sine ira et studio*, free from any theoretical bias.

To the younger men it must sound strange nowadays that not so very many years ago whether ectopic gestation, ruptured or unruptured, might be a surgical disease was at all debatable. Still fresh in my memory are the animated tilts I had with men then high in authority, who condemned

operative procedure and advocated injecting morphine into the fetal sac, or recommended turning on various electric currents, with the view to destroy the fetal life, as though all danger to the patient would pass after the electrocution of the ectopic fetus.

Even the propriety of recording specimens of tubal abortion or rupture as cases of ectopic gestation was disputed in the absence of a well-developed fetus, and the time-honored name hematosalpinx was substituted.

Fortunately, those times have passed. The symptomatology and pathology of ectopic pregnancy have been well studied and accurately described. Surgical interference is the universal and solely recognized therapeutic measure, notwithstanding the few sporadic cases which recover without it.

In fact, so strongly swung the pendulum in favor of early surgical interference that undue haste was charged against some of its adherents and a decided reaction set in, in the minds of some, as witnessed in last year's session of our Society and a number of subsequent essays. That the pendulum took too far an excursion to the other side, there is no doubt in my mind. But I cannot but admire the courage of those who took that stand against a popular conviction and were willing to be subjected to most adverse criticism.

When, then, shall we operate? No doubt exists as to the proper time in unruptured cases. The sooner the better is the watchword, although no one would think of operating in the middle of the night, or without proper preparation of the patient and her surroundings, including himself and assistants.

Diversity of opinion commences to exist after rupture has taken place. Still, the large majority will readily agree that if the first symptoms of rupture or of tubal abortion are recognized, involving usually but a moderate degree of internal hemorrhage or shock, operation is called for the same way as in unruptured cases, viz., as soon as proper conditions

and surroundings for an aseptic performance of a laparotomy can be procured, unnecessary delay to be as much avoided as undue haste.

We really commence to enter disputed ground when we are confronted with the cases that are in immediate danger and exhibit the symptoms of shock and acute hemorrhage. Much anxiety on our part and also much unnecessary discussion could be saved were we always able to distinguish satisfactorily between shock and hemorrhage. The physical signs of both being so much alike, it is often well-nigh impossible even for the most experienced one to determine beyond a reasonable doubt where the greater danger for the patient lies, and to steer clear of Scylla as well as Charybdis.

It will be impossible to lay down strict rules applicable to each and every case. We must individualize and also be guided by extraneous circumstances as to the place and surroundings of the patient. It has forcibly struck me that in all previous discussions on this subject the important factor of traumatism has not been sufficiently taken into consideration, this being responsible for unnecessary argumentation. By eliminating the cases where trauma superinduces acute hemorrhage and where the ectopic gestation is only a contributive condition, we will save much time and confusion.

For instance, in all cases where the ectopic gestation has been overlooked and dilatation and curettage for a supposed incomplete abortion were performed, causing *foudroyant* internal hemorrhage, it stands to reason that we must at once try to correct our mistake by opening the abdominal cavity to repair the damage done. It is self-evident that traction on the uterus, by means of a bullet forceps while the necessary dilatation preceding a curettage is done, may cause a big rent in the fetal sac and involve bloodvessels, much larger and more frequently of arterial type than an ordinary rupture or tubal abortion will ever present. Too vigorous bimanual

palpation and other injuries may also be cited as causative in this respect. The surgical axiom of at once tying the bleeding vessel or vessels holds indisputably good here as well as in other traumatic lesions accompanied by internal hemorrhage. However, this should not prejudice our actions in cases uncomplicated by trauma.

It is my firm conviction and belief, based on a very large experience with all kinds of ectopic conditions, that the first onset of rupture or tubal abortion is seldom if ever accompanied by an amount of bleeding which in itself would be dangerous to the woman's life. Fortunately for the patient prodromal symptoms, such as excruciating colicky pains, are often the first danger signals causing the woman to seek medical advice.

Right here lies the root of all possible evil as well as the ultimate salvation of the patient. Should she complain to a man who will be satisfied to prescribe a narcotic for her, she will remain ignorant of the threatening danger until it may be too late. On the other hand, should she consult a physician, who, after listening to her story, would at least suspect ectopic gestation and if still in doubt after his examination would at once refer her to the gynecologist, all would be well.

In the last year the state of affairs in New York has taken a most favorable aspect in this regard. The intelligent and well-to-do will apply early to the specialist, or will be referred to him by the family physician. The poorer classes have just as good a chance, as the many modern dispensaries and hospitals furnish them early advice and surgical help. Ignorance and prejudice against surgical operations are rapidly dying out among the masses. As a result of these conditions the total number of laparotomies for ectopic gestation is constantly on the increase in most of our institutions, while the proportion of neglected cases to the early diagnosticated ones is steadily becoming smaller.

Still there remains a certain percentage of cases where, after a more or less prolonged period in which no heed has been paid to prodromal symptoms, severe and alarming attacks demand our services at once.

Most of these cases are brought to the hospital by the ambulance service, and the question of immediate or deferred operation becomes essential.

In former years it was my iron-bound rule not to lose a minute, but in all cases hurriedly to open the abdomen irrespective of any other considerations. The results were good, but not entirely to my satisfaction. It would happen that I could not be reached quickly and that, in the absence of another surgeon, an inexperienced house surgeon would have to perform most difficult work in the middle of the night, tired from a hard day's work of assisting in the operating room, with a tired staff of assistants and nurses. Again, I would arrive at the hospital shortly after the patient had been brought in, find her in deep collapse, would at once proceed with the operation, only to find on opening the abdomen that the hemorrhage had ceased and that the total amount of blood lost was small, at any rate not sufficient to have caused such profound collapse.

I could not help asking myself when after a rapidly and, may I venture to say, brilliantly performed laparotomy, when all hands were kept busy reviving the patient from shock, what would have been the patient's fate if a less experienced and slower operator had performed the operation under less favorable surroundings than a perfectly appointed, modern operating room? Again, when I had the patient out of immediate danger, if suppuration in the abdominal wound due to imperfect preparation of the patient, or incomplete asepsis during the hurried performance of the work would prolong the recovery, I would ask myself would it not have been better to have waited till the following morning? Slowly but surely I came to the conclusion that the

greater safety for the patient did not lie in a post-haste operation, but, with rare exceptions, in allowing her a reasonable time to recover from shock, while prepared to go ahead at short notice should any sign of recurrent hemorrhage appear. Not a single life has been lost from hemorrhage or shock since I adopted that rule, and I believe that it can safely be assumed that some have been spared who otherwise would have succumbed.

To be brief (I will not go into extensive statistics), suffice it to state that since the opening of the new Mt. Sinai Hospital until the present day, a period of four years, nearly one hundred cases of ectopic gestation have been admitted to my service. All with the exception of one, who went home against my advice, were operated upon, with but two deaths: one resulting from ether pneumonia and the other from a septic condition existing prior to admission. None died from hemorrhage or shock.

The time allowed to elapse between admission and operation varied from several hours to four days, the average time being two days. In cases of profound collapse, morphine was given hypodermically, heat applied to the body, and the foot of the bed raised. No intravenous infusion was ever given until after the operation was nearly completed. Bimanual examination was always made in a most careful way.

If within half an hour after the admission of a patient to the hospital in collapse her pulse showed marked improvement, it was assumed that active hemorrhage had stopped and efforts to overcome the shock were continued while her pulse was taken every fifteen minutes up to the time of operation. Let me repeat here that in a number of cases the amount of blood found in the abdominal cavity was by no means proportionate to the severity of the shock. The statement to the contrary is arbitrary, and, in the light of my experience, erroneous.

I mentioned before that the longest time allowed to elapse

between admission and operation was four days. I want to qualify this statement by adding that in none of these cases was it actually deemed necessary to wait that long before operation was resorted to. However, these cases had all recuperated so nicely from the shock on the second day that I felt justified in not interfering with the routine work of the institution, and deferred operation until my next regular operating day. In the meantime they were kept under strict surveillance.

Never in all my experience have I met with a single case where I would consider it justifiable to defer the operation longer than a few days. Certainly not in a medical centre, where a nearby hospital can easily be reached by ambulance, or where even in the most squalid quarters aseptic conditions and proper assistance may be obtained at short notice.

Up to the present time I have strictly adhered to my purpose to give my personal views only as far as they are sustained by my own experience. However, I feel it my duty to venture farther and state what I deem advisable for the country practitioner to do when suddenly confronted with a case of ruptured ectopic gestation. If he has some surgical training, and feels confident that he can accomplish the work, by all means let him do it.

He can easily get his kit of tools ready, a scalpel, a pair of scissors, a few hemostatic forceps, a needle, some sterile tying and suturing material, and a pair of sterile rubber gloves are all he needs.

Let him remember, however, that while he is busy getting things ready, efforts should be made to overcome the shock of the patient. By the time the water has been boiled and other necessary preparations completed, say in twenty or thirty minutes, should he find the patient to be in a decidedly better condition, do not let him be hasty. He has won the first skirmish; let him gird his belt a little tighter, summon

his reserve forces, and he will then be in a still better position to triumph over menacing death.

Should he feel that the task is too much for him, *then and only then* let him carry out the temporizing instructions of the gentlemen who had the courage to demonstrate to us that cases may be kept alive in a hibernating state not only for days but for weeks, at any rate long enough until competent surgical help can be summoned.

I am now coming to the close of my paper. Our highest aim in all branches of medicine and surgery should be prophylaxis. Since we can never hope to prevent ectopic conception, we must strive for the next best, viz., early diagnosis followed by early surgical cure of this most treacherous disease of woman. We must not be satisfied to do the right thing ourselves; no, gentlemen, our campaign must be an educational one, including not only the medical student and the general practitioner, but also the masses.

When the majority of women commence to realize the early prodromal symptoms of ectopic gestation and are familiar with the perfect results of early surgical interference, we can feel that we have fulfilled a great and glorious mission.

DEFERRED OPERATION FOR INTRA-ABDOMINAL HEMORRHAGE DUE TO TUBAL PREGNANCY.

By F. F. Simpson, M.D.,
Pittsburg.

We should never lose sight of the fact that the judgment, skill, facilities, and locality of the teacher very often differ widely from those of the students who go out to apply the principles he has taught them. This in large measure leads to varying methods of accomplishing a given purpose and accounts for divergent views regarding the treatment of tubal pregnancy.

In the writer's judgment there can be no rule of thumb, no single plan of action, which can be wisely applied to all cases under all conditions.

To indicate at the outset the line of thought this paper embodies, I submit four general propositions:

1. Extra-uterine pregnancy is always a grave affection, and operation should usually be done at the earliest elective period and under elective conditions.

2. It seems within the range of possibility that by a re-adjustment of teaching regarding early symptomatology and prognosis, the vast majority of the cases may be recognized and appropriate treatment instituted during the non-tragic, which is the safe stage of the disease.

3. Operation when the patient is acutely ill is always serious. This is particularly true if the operator be unskilled or the surroundings unfavorable.

4. A consideration of the general subject of hemorrhage, the writings of many operators, and my personal experience lead me to believe that intra-abdominal hemorrhage due to ectopic gestation does not necessarily have as high a mortality as prevalent teaching would indicate.

1. There can be no doubt (*a*) that extra-uterine pregnancy is a grave affection if proper treatment is not promptly instituted. This is abundantly shown by the unrecognized and hence improperly treated cases that go to the coroner. (*b*) Further, all will admit that immediate operation, under elective conditions is safer than the disease, provided it is recognized before rupture or abortion, or before a severe hemorrhage has reduced the patient's margin of reserve strength. Even if the patient's reserve strength has been materially reduced by hemorrhage, she may again become a favorable operative risk by a short period of appropriate treatment. Another elective period for operation may thus be reached.

The elective conditions for operation will, in my judgment, invariably include: (1) A patient with a good margin of reserve strength; (2) a competent abdominal operator whose experience with this affection has been both extensive and satisfactory; (3) skilled assistants and attendants; (4) appropriate surroundings; (5) adequate preparation.

2. So much stress has been laid upon the ghastly picture enacted by grave hemorrhage that relatively few advanced cases go unrecognized today.

But why wait until this dangerous period is reached? Could not the disease just as well be recognized early if pictured as accurately, vividly, and persistently as the tragic stage, and always as its inseparable companion picture? Tubal pregnancy is relatively infrequent. It is, indeed, the exception for one general practitioner, however busy he may be, to see a dozen cases during his entire professional career. His idea of the affection must therefore come to

him ready made. If he believes that ectopic gestation is so grave an affection that immediate operation must always be done or the patient will perish, he will fail to recognize the picture habitually presented in the safe stage of the disease. As a *practical fact*, does the teaching of today actually result in early or late diagnosis? This question is eloquently answered by Dr. Philander A. Harris, who shows that in his series "(*a*) more than 90 per cent. of the 130 patients consulted a physician on account of symptoms referable to the pelvis before the tragic stage was reached. . . . (*g*) Only about 20 per cent. of the physicians consulted in the non-tragic stage arrived at a correct presumptive diagnosis."

Dr. Harris has given us a clear-cut distinction between the tragic and non-tragic stages of the disease, and has linked them together as companion and contrast pictures. His paper forcefully directs the attention of the profession to the wide difference between the safe and the unsafe periods for the application of well-planned lines of treatment, whether they be immediately surgical, deferred surgical, or at times medical alone.

He gives the following as sufficient evidence for presumptive diagnosis:

"When any woman after puberty and before the menopause, who has menstruated regularly and painlessly, goes four, five, six, eight, ten, fifteen, or eighteen days over the time at which menstruation is due, sees blood from the vagina differing in quality, color, quantity, or continuance from her usual menstrual flow, and has pains, generally severe in one side of the pelvis or the other, or possibly in the hypogastric region, ectopic gestation may be presumed."

Such a history should invariably lead the medical attendant to seek expert advice.

3. Operation when the patient is acutely ill is always serious. One can scarcely conceive of less favorable conditions for

an abdominal operation than surroundings that are bad, equipment meagre, preparation crude, the operator inexperienced, the assistants and attendants inadequate and unskilled, and the bloodless patient's margin of reserve strength narrow, as it must be if death is imminent. Fortunately such conditions do not always obtain, as is shown by the fact that many eminent surgeons, many of them honored members of this Society, have habitually done immediate operation with an extremely low mortality. Yet when Dr. Robb, whose work is of such a high order of excellence that he is able to report a series of more than 100 consecutive abdominal sections without mortality, asserts that he can save more patients in a grave condition by deferred operation, it is time for us to pause and seriously consider the wisdom of *teaching* a penknife policy.

An analysis of 575 cases of ectopic gestation taken indiscriminately from the literature of the last five years shows some interesting facts. Of that number, operation was done within twenty-four hours of rupture 115 times, with 26 deaths, or 22.6 per cent. mortality. Operation was not done within twenty-four hours of rupture 461 times, with 31 deaths, or 6.7 per cent. mortality.

This striking difference in mortality is due to the fact that the cases were not parallel, there being a larger percentage of grave cases when early operation was done.

Seventy-five patients were critically ill at the time of operation within twenty-four hours, with 26 deaths, or 34.6 mortality; whereas 24 patients equally ill were not operated upon within twenty-four hours, with 7 deaths, or 29.1 per cent. mortality.

We thus have a difference of 5 per cent. mortality in favor of deferred operation where the exact plan of treatment is not definitely stated. In striking contrast to these results of much of the current teaching, *i. e.*, immediate operation with *no* alterative plan of treatment, I would submit 5

cases reported by Robb, 5 cases reported by Stillwagen, and 17 cases that came under my personal care, all subjected to deferred operation and without mortality. In my cases the evidences of grave illness were clinical and pathological. The clinical evidences were syncope, with air hunger, extreme pallor, and a very feeble pulse that exceeded 140 beats per minute for at least twelve hours. The pathological evidences were a low blood count made at a variable period from one day to six weeks after rupture, the point of rupture, and the quantity of blood removed at the time of operation. In all, the clinical picture was typical. In all, the quantity of blood removed was sufficient to indicate a severe hemorrhage, at least a pint and a half being found in each instance, and more than a quart in most of them. In seven cases the rupture occurred within a half inch of the uterus. In an eighth I recognized an unruptured interstitial pregnancy and advised immediate operation. The patient did not think she was ill enough for that. Four days later, while at market, the rupture occurred, later the badly damaged uterus and a three months' fetus were removed.

In this series of cases the treatment was definite and systematic. Operation was purposely deferred, and, despite the fact that all were desperate cases, not one died either from the disease or from subsequent operation. We thus have 75 really grave cases taken from the literature, with 34.6 per cent. mortality from the disease plus immediate operation, and 27 really grave cases by Robb, Stillwagen, and myself without mortality from the disease plus deferred operation.

4. *Hemorrhage.* Because of the extreme importance of this subject, I would once more direct attention to a comparative study of hemorrhage from this and other sources.

(*a*) *Gastric Hemorrhage.* "Immediately fatal cases of gastric hemorrhage are comparatively rare." (Ewald.)

"Hematemesis rarely proves fatal." (Osler.)

Mr. Moynihan, referring to hemorrhage from chronic gastric and duodenal ulcer, groups his cases in four classes as follows:

(1) The hemorrhage is latent or concealed, is always trivial, and often inconspicuous.

(2) The hemorrhage is intermittent, but in moderate quantity, occurring spontaneously and with apparent caprice at infrequent intervals. The life of the patient is never in jeopardy from loss of blood, though anemia is a persistent symptom.

(3) The hemorrhage occurs generally, but not always, after a warning exacerbation of chronic symptoms. It is rapidly repeated, is always abundant, its persistence and excess cause grave peril, and will, if unchecked, be the determining cause of the patient's death.

(4) The hemorrhage is instant, overwhelming, and lethal. (The author says: "In my own experience only one such example has occurred, a large and oval opening being then found in the splenic artery.")

With regard to hemorrhage from acute ulcer, however, Mr. Moynihan has this to say: "The vomiting of blood comes unexpectedly and suddenly, a large quantity of blood is lost, and the patient suffers, often in an extreme degree, from the symptoms of hemorrhage. The pulse becomes feeble and fluttering, the face waxen, and the body surface cold and clammy. For a time symptoms may give rise to a serious alarm, but a rally is seldom long delayed.

"The characteristics of hemorrhage from acute gastric ulcer are, therefore, the marked tendency to spontaneous cessation, the frequency of a repetition of the hemorrhage in any way but trivial quantity and transience of the resulting anemia." (B. G. C. Moynihan.)

"Cases in which hemorrhage is so severe as to cause death are rare." (Franz Riegel.)

"A single hemorrhage is rarely so profuse as to cause immediate death." Also, "It is exceptional for gastric hemorrhage to prove immediately fatal." (Pepper.)

Other like opinions are expressed by Pepper, Zeimssen, Thompson, and others.

Recently (1906) Collier has reported 180 consecutive cases of gastric hemorrhage treated medically without mortality. Commenting upon this observation, Stengel and Edsall say their experience is in strict accord. Russel reports 98 cases of hemorrhage from gastric ulcer, with no known death from hemorrhage. True, this is not a universal experience, but might it not become so if the same measures were employed with equal skill?

(*b*) *Intestinal Hemorrhage.* "In order that a patient finally die as a result of hemorrhage (typhoid), its repeated occurrence is necessary. Fulminant, rapidly fatal cases are, fortunately, not common. A fatal termination in the course of two or three days is rare, after a repetition of a hemorrhage." (Curschmann.)

"Very rarely a patient will bleed to death." (Tyson.)

In 1500 cases of typhoid fever treated in my wards, hemorrhage occurred in 118, with death in 12 cases" (10 per cent.). (Osler.)

The death rate from recurrent hemorrhage together with persistence of the original disease (typhoid fever) is variously estimated as from 10 per cent. to 44 per cent. by such observers as Osler (10 per cent.), Tyson, Nothnagel, Liebermeister (38 per cent.), Homolle (44 per cent.), Greisinger (30 per cent.), and others.

(*c*) *Pulmonary Hemorrhage.* "Hemorrhages that occur in the early stage of phthisis may be profuse, but they are rarely dangerous. In advanced stages it may be the immediate cause of death." (Loomis.)

"Even in advanced phthisis, patients seldom die from the immediate effect of hemorrhage." (Thompson.)

"In phthisis, hemorrhage may be the direct cause of death, but, as a rule, the patient survives it." (Strumpel.)

"Hemorrhages from the bronchi may be small or large, but, even if large and continued for several days, they are seldom fatal." (Delafield.)

Uterine hemorrhage occurring in the course of cancer, uterine fibroids, and arteriosclerosis of the uterine vessels may be persistent, repeated, and alarming; but death from a single hemorrhage is extremely rare. This observation is too common to permit of quoting authorities.

That recovery may take place after the sudden loss of a very considerable quantity of blood is shown by cases recorded by the following authorities:

Gastric Ulcer. A. W. Mayo Robson, Case 5, two pints; recovery. Case 6, two pints; recovery. A. H. Breck, over six pints of blood by measurement in two and one-half days; recovery. C. B. Keetley, Case 3, some quarts of blood; recovery. E. P. Joslin, hand-basinful of blood and repeated on following days; recovery.

Hemorrhage Complicating Typhoid Fever. W. Coleman, typhoid fever patient lost in one hemorrhage three to four pints of blood; recovery. J. R. Durham, typhoid fever, three pints of fresh blood at one time, in all about six pints. B. F. Stahl, typhoid, hemorrhage, 84 ounces; recovery.

Hemorrhage, Postpartum. Edward Reynolds, two quarts; recovery. J. M. Sligh, three quarts; recovery.

I have personal knowledge of a man who in one afternoon lost three quarts of blood and made a speedy recovery.

It would seem that a sufficient number of recognized authorities have been quoted to sustain the point that primary hemorrhage from the stomach, intestines, lungs, or uterus may be severe, but rarely proves fatal.

My personal experience leads me to believe that the same is true of intra-abdominal hemorrhage due to tubal pregnancy. In a series of something more than one hundred consecutive

cases of extra-uterine pregnancy seen in almost all phases of the disease, I have not seen one patient bleed to death at the time of rupture, though two have died from hemorrhage. A seven months' living fetus was removed from one woman; she bled to death at the time of operation, which was done with great skill at a time of choice. One other patient, one of my own, died from hemorrhage plus immediate operation. The death rate in this series of more than one hundred cases was slightly less than 4 per cent., there being four deaths in the entire series that has come under my observation.

Of this series, approximately 50 were seen in the capacity of assistant. Fifty-eight were my own cases. In my series there were only 2 deaths, one due to hemorrhage plus immediate operation and the other to postoperative peritonitis, which proved fatal in thirty hours. This woman was young and anxious for children; she insisted that one tube be saved. Her ectopic mass was about the size of an egg. The opposite tube was closed and contained about two drams of fluid. The ectopic mass was removed. The other closed tube was opened. An attempt was made to keep it patulous. It is my belief that the infection was probably due to material from the opposite tube, and death might have been averted if both tubes had been removed. This case is reported in detail to show that the ectopic mass probably had no connection whatever with the fatal infection.

5. *Recurrence of Bleeding.* The retching, vomiting, and churning due to fresh blood in the stomach, together with the digestion of clots, afford sufficient reasons for persistent, repeated, and profuse hemorrhage from gastric ulcer. There is likewise sufficient reason for intestinal hemorrhage to recur. The contents of the small intestines are normally liquid until they pass the ileocecal valve. When the blood is poured into the intestinal canal, as from a typhoid fever ulcer, it coagulates and the clots stimulate more excessive peristalsis. This vermicular action may very readily squeeze the clot from the

eroded vessel, or the processes of digestion may remove it. Again, the vessel gaps and hemorrhage returns.

So also with pulmonary hemorrhage. The normal functions are exaggerated, and breathing and coughing readily dislodge the clots which afford temporary protection from bleeding.

Vascular changes, traumatism, and periodicity afford adequate cause for repeated uterine hemorrhages.

In striking contrast to the foregoing conditions, in which repeated hemorrhages would seem the rule, we find bleeding from tubal abortion or a ruptured tubal pregnancy. In this affection there is rarely any involuntary or physiological reason why a blood clot, once formed, should be dislodged or digested. In order for the clot to become detached, some extraneous cause must usually exist, such as exertion, curetting, a vigorous examination, or the disturbance incident to being transported to a hospital.

It is a matter of common observation that a patient with a tubal pregnancy has had a sharp, severe pain in one side and a slight hemorrhage which apparently ceased. After a few days of confinement to bed she would think herself well or become impatient and resume her usual duties. Following housework, a walk, drive, or other exertion, sudden pain and severe hemorrhage would occur.

In my 58 cases an occurrence was noted six times, as follows:

Case I.—Mrs. S. had gone a week over her period, and consulted her physician because of a sharp, tearing pain in her side. She was given a hypodermic, told to remain in bed, and treatment directed. A few days later she got up hurriedly for some purpose, was seized with severe pain, and fell over in a faint. I saw her with her family physician; treatment was agreed upon. Weeks later she was sent to hospital and the ectopic debris removed. Convalescence was normal and recovery complete.

Case II.—Mrs. L. remained in bed eleven days after her first rupture. Contrary to her physician's instructions she got out of bed and walked a mile to attend to some matters of business. While away she had a severe pain, became gravely ill, and was carried home. I saw her with her physician about eight hours later. We agreed upon a line of treatment, which was carried out. At the end of ten days she was brought to the hospital; operation was done twenty days later. She recovered completely.

Case III.—Mrs. R. had her first hemorrhage when her period was about one week overdue. Her next hemorrhage occurred about three weeks later. She was a strong woman and the loss of blood was not great. Though the history was typical, her disability was slight, and she continued her usual mode of living. On the day of the last hemorrhage she called to see a physician on another floor in the building in which my office is located. She became suddenly ill and was brought up to my office. At that time she was very weak, pale, and short of breath. Her pulse was between 130 and 140, her temperature 99°. While at the office a blood examination showed hemoglobin, 60 per cent.; leukocytes, 11,000; red blood cells, 3,820,000. An ambulance was called and she was taken to the Allegheny General Hospital. She reacted promptly, and was thought to be in good condition for operation seventeen days later. At operation we found a tubal abortion with three distinct clots of different ages, indicating three distinct hemorrhages. Each of the two more recent sacs contained more than a pint of clots. Her convalescence was uncomplicated. She looked and felt perfectly well when seen three months later.

Case IV.—Mrs. D., who was about five days overdue, had her first pain July 4, 1907. The following day she had another, and remained in bed a few days, when she was allowed to resume her usual duties. During this time she was continuously losing a small quantity of dark ropy

blood. July 19 she jumped quickly from bed, felt a sudden severe pain, fainted, became acutely anemic and gravely ill. Her family physician asked me to see her with him. Her pulse was still more than 140 and feeble. A good nurse was gotten, treatment begun, and in about a week it was thought safe to take her to the Columbia Hospital, though she was not a fit subject for an elective operation. I was preparing to leave the city for a month, and the patient expressed a desire to defer operation until my return. Though I felt no apprehension regarding her safety, it was arranged that operation should be done at any time if it seemed necessary. Early in September, about six weeks from the time of rupture, she was a good subject for elective work. We removed about a quart of blood clot and a tube that was ruptured within less than half an inch from the uterus. Her recovery was prompt and complete.

Case V.—Mrs. M. was seen with her family physician about sixty miles from the city. She had missed her period and had two attacks of pain, each requiring morphine. After the second she remained in bed a few days. About ten days after the second attack she walked down stairs and became acutely ill. I saw her that night. After about two weeks of rest and tonic treatment carried out by her physician, she was brought to the hospital. Further bleeding occurred as a result of her trip. About ten days later the cul-de-sac was incised and a quart of blood evacuated.

Case VI.—Mrs. K., a young married woman, always regular, was overdue a few days, when she had severe pain and cast off a membrane, March 23, 1908. She continued to lose a little dark ropy blood almost continuously for a month. There was not the slightest systemic evidence of internal hemorrhage. During the succeeding five weeks she had four other attacks of severe pain without systemic effect; however, during the greater part of that time she was going up and down five flights of stairs about once a day, and the

pain usually came after such exercise. At operation we found a few ounces of blood in the pelvis and an unruptured tube, the product of conception having died early and remained at about the junction of the middle and outer thirds.

Not infrequently a mistaken diagnosis of incomplete abortion is made. In some of these cases the patient is curetted and renewed bleeding brought about. This occurred in four of my cases. One became acutely ill, the other three did not, though their symptoms were aggravated.

Less frequently it happens that a patient who feels that she is pregnant attempts to produce an abortion and precipitates a rupture. In two of my cases the use of a catheter was the exciting cause of a second hemorrhage, the first having been slight.

Every operator of wide experience can recall cases in which a repetition or at least a marked increase of hemorrhage followed quickly upon a thorough bimanual examination. My personal observation includes three cases, as follows:

Mrs. S. was examined at his office by a prominent gynecologist of our city; she felt some pain. That night I saw her at her home, some twenty-five miles out of town. She was quite sick, but not seriously so. She was kept at rest under the care of her family physician, and about ten days later taken to the hospital, where I assisted the examiner in the evacuation of about a pint of blood clot from the cul-de-sac. Another of my cases has been previously reported; a third lost about four additional ounces of blood as a result of the examination.

There is no doubt in my mind that the exertion, jolting, and other disturbance incident to transporting a patient to a hospital are a very probable cause of continued or repeated bleeding. So firmly am I convinced of this and of the efficacy of rest as the chief factor in checking and preventing recurrent hemorrhage of this nature, that I have habitually advised at least a week or ten days of delay in sending to the hospital a

patient seen some distance away. In three cases, and three only, have I observed a repetition of bleeding due to this cause. One entered the hospital the day of her hemorrhage, and the other two within two or three days of the last preceding hemorrhage.

One patient, my first case of tubal pregnancy, was seen by her physician at the time of her first pain. He gave her a hypodermic injection of morphine, and was again called to see her at a second pain one week later. Her third pain occurred three days later, and he was again called. He found her very ill, and sent her to the hospital. An intravenous injection of normal salt solution and other stimulation were given. Reaction was not satisfactory. She was operated upon at once. Our patient died on the table. It may be said that a more skilled operator would have saved her life. That may be true, but I justified myself there by the facts that I was acting in accord with the teaching of the day and that I was not wholly unprepared for such work, as I had assisted a gynecologist of unusual skill and good judgment for more than two years. Let me ask how often such a tragedy is enacted throughout this land each year by those of like limited experience because they feel impelled to act promptly and rescue their supposedly perishing patient?

It will be seen that in my own cases the question of recurrent bleeding and its cause were definitely recorded twenty-one times. In these 21 cases recurrence was precipitated by extraneous and preventable causes 19 times. In one case, my first ectopic, the patient was stimulated, given an intravenous injection of normal salt solution, and immediate operation was done. The patient died on the table.

In 18 cases the bleeding was completely controlled by appropriate non-surgical measures. These patients were later operated upon and recovered.

In the two remaining cases bleeding was essentially a part of the disease. In each of these there was a living fetus

which continued to grow, and hemorrhage was recognized by the repetition of slight pain rather than systemic evidences of loss of blood. These patients were in the hospital, in favorable conditions and safe surgical surroundings. Both made a good recovery after operation.

From the foregoing facts relative to hemorrhage in general and our own cases of hemorrhage from ectopic gestation, both primary and recurrent, it seems reasonable to conclude that under certain conditions the mortality need not of necessity be high. This applies to those who have reached the tragic stage as well as the less advanced cases.

The treatment which has proved uniformly satisfactory and safe in our hands has been as definite and precise as that demanded for any elective surgical procedure. It should consist essentially in a competent, confident, quick attendant of strong personality, preferably a thoroughly tested graduate nurse; absolute rest in one position without a single voluntary movement for a period sufficient to permit a firm clot to close the severed vessel. (As indicated by the use of clamps in vaginal hysterectomy, this probably exceeds forty-eight hours.)

The absolute avoidance of examinations is often desirable. In serious cases the diagnosis can usually be made from the history alone, and in such cases it is most unwise to run the risk of starting fresh bleeding by a vigorous examination. The unnecessary expenditure of energy can be controlled by the use of small doses of morphine during the first few days. Normal temperature is to be kept up by external heat. The volume of blood lost may readily be replaced by a small quantity of normal salt solution given cautiously into a vein. It may be maintained by continuous enteroclysis, normal salt solution being used at the rate of ten to fifteen ounces an hour. The equilibrium of the circulation may be established by the use of small doses of strychnine, camphor, and digitalis, and by the use of small doses of adrenalic

chlorides given with the intravenous injection or with the enteroclysis.

Care and much good judgment must be used to avoid raising blood pressure sufficiently to cause fresh bleeding, though I am inclined to the belief that this danger has been overestimated.

Of my cases, 58 were under my personal care from the time of maximum depression. They were seen at my office, or sent directly to the hospital by their medical attendants. Twenty-six patients I saw from time to time with their family physician. Nineteen of the patients had partially recovered before coming to the hospital. Some of these lived a distance from the city. Their physician telephoned me regarding them. These patients did not usually come to the hospital in less than ten days or two weeks, but they all came—and recovered.

CONCLUSIONS.

1. Extra-uterine pregnancy is always to be looked upon as a serious affection, though not necessarily immediately fatal. In substantiation of that fact, I submit 100 consecutive cases without mortality from hemorrhage.

2. It usually requires operation. Pending that procedure the patient should be handled with extreme care.

3. Operation when a patient is acutely ill is always serious. This is particularly true if the operator be unskilled or the surroundings unfavorable.

4. The decision for immediate operation is at times entirely proper, but it should rest upon a low mortality, for such operations in the individual operator's hands, rather than an essentially high mortality the disease has been credited with having.

IMMEDIATE *VERSUS* DEFERRED OPERATION FOR INTRA-ABDOMINAL HEMORRHAGE DUE TO TUBAL PREGNANCY.

By Hiram N. Vineberg, M.D.,
New York.

In discussing the subject of the treatment of intraperitoneal hemorrhage from tubal rupture or abortion, we must take into account the amount of blood effused into the peritoneal cavity in each individual case. As we all know, this varies within very wide bounds, depending upon the portion of the tube which has been ruptured or eroded. Again, we know that in tubal abortion the quantity of blood poured into the general peritoneal cavity at times may be very great, equalling in amount that occurring in the most severe form of tubal rupture. This is not a mere matter of theory, but of actual observation by different operators. We know also that the raw area of a tube which has ruptured or has been eroded will go on bleeding for an indefinite time, or the bleeding may cease for a time, to be renewed again after the lapse of a variable period. This renewed bleeding may take place while the patient is at rest in bed, and has been known to occur even while the patient was asleep. Of course, it is more likely to occur after some slight exertion or after a bimanual examination, which need not be carried out with any undue violence. As a matter of experience, we know that in the vast majority of cases the amount of blood effused into the abdominal cavity

either from abortion or rupture is not so great as to be a direct menace to the life of the patient. Still, with the lesser degrees of intraperitoneal hemorrhage, the attendant symptoms may be quite alarming and may simulate, in a marked degree, those attendant upon the more copious effusions. There will apparently be the same degree of pallor, the patient may go into apparent collapse, and the pulse may become imperceptible. But in these cases reaction will occur within a comparatively short time. The acute observer will be able to note in these cases that the symptoms of collapse were due to the shock attendant upon the impact of blood upon the peritoneum rather than to acute anemia.

Now, whether we operate upon these cases—forming about 95 per cent. of all the cases that come to the operator—shortly after the hemorrhage has taken place, or wait for a day or two to suit the exigencies of the case or the convenience of the operator, or the service in the hospital, in my opinion matters but little. Theoretically, the results ought to be better if time be taken for the preparation of the patient, and I am not inclined to split hairs upon this point. So far as my own experience goes, my emergency patients have gotten well equally as satisfactorily, and often more so, than when they had been subjected to preparations for a couple of days before the operation. I think we learned from last year's discussion, in this Society, that the active preparation of the patient prior to laparotomy, to which many laid such store, was a fetich and often did more harm than good. This I do know, that since we have given up the active purgation and preparation of the patient formerly in vogue in the hospital, our patients have suffered much less from meteorism and other discomforts following abdominal sections. From what I have said thus far, it is evident that there is not much room for a difference of opinion as to the time of operation in about, roughly speaking, 95 per cent. of the cases, that is, if we assume that all cases of tubal rupture or abortion ought

to be operated upon. Whether this assumption is a correct one will be discussed later.

It is, then, in the treatment of the remaining 5 per cent. that the bone of contention is to be met. This percentage is composed of the cases of tubal abortion or rupture in which the amount of blood effused is so great as to inundate the entire abdominal cavity, distending it to its greatest extent, pushing the diaphragm upward to such a degree as to seriously crowd the heart and lungs, and placing the life of the patient in the greatest jeopardy or killing her outright in from one to twenty-four hours. These cases the writer has termed "cataclysmic," from the suddenness of the event and from its overpowering character. In operating upon them it is like cutting through the abdominal wall of a corpse, the tissues being practically bloodless. When the peritoneum is reached, it is found of a very dark color and bulging outward, and when incised the blood spurts out with considerable force. The patients are either apathetic, and partly or wholly unconscious, or are restless and in great anxiety. The countenance is of a sickly, livid color or deathly white, the mucous membranes of the lips and eyes are completely blanched, and the pulse is very small, soft, and rapid, or is totally absent in the vessels at the wrist.

The assertion has been made that no matter how alarming the condition may apparently be, the patient seldom dies if the spark of life be not extinguished by surgical intervention. I cannot dismiss the thought that the gentlemen who make such an assertion have mistaken the cases with moderate and even profuse intraperitoneal hemorrhage attended with symptoms of collapse for the class I have just described. My suspicions receive support when these gentlemen place cases with a hemoglobin of 55 and 65 per cent. into this class, in which the percentage of hemoglobin is usually less than 30 per cent. or almost nil. Further support of my suspicion is obtained from the statement that six such cases were met with

in a total of 20 cases. This, no doubt, can be better understood when the writer states that during the last ten years he has operated upon 84 cases, 20 of which were attended with copious intraperitoneal hemorrhage. Of these 20 cases, in only 6 would he consider the hemorrhage was so great as to entitle them to be placed in the cataclysmic class. That the patients belonging to this class will often die even if not operated upon, one has only to recall his own experience, or to glance through the literature for a single year.

The only case in my experience that died from intraperitoneal hemorrhage was the one I did not operate upon, not being able to obtain consent until it was too late, while the other 6 cases operated upon immediately made prompt recoveries. I had only one death in the entire series of 84 cases, and that patient died three weeks after the operation from an ether pneumonia.

As an argument in support of the assertion that patients rarely die from hemorrhage in ectopic pregnancy, an analogy has been drawn between the hemorrhage in gastric ulcer and intestinal perforation in typhoid. It is stated that death from hemorrhage in these conditions is extremely rare. Let us see what the most recent and reliable statistics—those collected by J. H. Musser in his paper before the Congress of American Physicians last year—show in this connection. The mortality in acute large hemorrhage in gastric ulcer is placed by Musser at 22.4 per cent. Osler, quoting the result of 2000 autopsies in typhoid in Munich, states that death occurred from hemorrhage of the bowel in 99 cases, that is, in over 20 per cent. It was the cause of death in 11 cases in 56 deaths in Osler's cases, which is also about 20 per cent. In perforation of the intestines in typhoid there is practically no hemorrhage, and the mortality of this complication is caused by peritonitis. The analogy therefore was not a happy one. But we need no comparisons to tell us how fatal a disease ectopic pregnancy is when left

alone. We need only to look up the pages of the celebrated work by Parry, in which 500 cases are analyzed; 163 of these recovered and 336 died (67 per cent.). There were 174 deaths, or 52 per cent., from rupture of the gravid cyst.

R. Werth, of Kiel, whom no one would accuse of not being conservative, says in this connection: "Operative gynecology has effected a genuine triumph in instituting an active treatment in the life-threatening hemorrhages within the peritoneum consequent upon tubal rupture, more rarely upon tubal abortion." "Formerly," he adds, "we stood helpless in the face of such a catastrophe, and at least 80 per cent. of the victims succumbed to it." No one will deny that the patients rarely die from the first intraperitoneal hemorrhage, for the bleeding will generally cease when the heart's action is greatly depressed, but the eroded vessels will begin to bleed again as soon as the heart regains some of its power. It requires but a little extra loss of blood to extinguish the life of these patients. The question of shock in these cases is to my mind a bugbear which we need not take into serious consideration. What would we think of an operator who would fear to reopen the abdomen to arrest a postoperative hemorrhage because the patient was in deep shock from just having been subjected to a serious and lengthy operation? We know, and most of us by experience, what would happen if we should wait for the patient to rally or if the condition had not been diagnosticated in due time. We need no experiments on the lower animals to teach us what the outcome in a human being would be if the ligature should slip off, either from the ovarian or uterine arteries. We have seen patients brought to death's door and beyond it from the bleeding of very much smaller vessels, and even from the cut edges of the vaginal wall after a total hysterectomy, and from a tear in one of the veins of the broad ligaments. Personally, I have been very fortunate in this regard, never having lost a patient from postoperative hemorrhage,

and not having even encountered it during the first ten years of my active work. But during the past two years I have had quite a few cases, and I feel that the lives of my patients were saved by my promptly re-opening the abdomen and arresting the bleeding points. And I feel exactly in the same way about my prompt action in the six cataclysmic cases of ectopic pregnancy that have occurred in my practice. I wish to add here, however, that I lay great stress in these cases upon an intravenous saline infusion, expeditiously and skilfully given. I use the latter adjectives advisedly, for I have seen experienced and skilful surgeons make a sad botch of this apparently simple procedure, and lose over it very valuable time, during which the patient's life had time to ebb away. As a rule, the recent hospital interne, or graduate can carry out this maneuvre with the greatest despatch and dexterity. This I deem one of the greatest advantages in having the patient in a hospital. The danger of infection in operating in the patient's home I consider slight, and in one of the worst cases in my series I was compelled to do so with only the kit of instruments for ordinary curetting at hand. Although the abdominal wall was very thick and fat, there was primary union of the wound. But I feel convinced the patient would not have survived, were it not that Mount Sinai Hospital was close by, and I was able to have a couple of internes come almost immediately and administer an intravenous saline infusion in either arm. A word more about the catchy phrase of adding shock to shock. When the surgeon meets with a case of injury to the intestine, let us say a gunshot wound or an incarceration, he is not deterred by the shock, which may be very profound, from opening the abdomen at once so as to cleanse the peritoneal cavity and repair the injury. The proportion of recoveries will be in direct ratio to the promptness with which he has been able to act.

I think we gynecologists would be taking a long stride

backward in surgery if we were to adopt the measures of delay recently advocated with such warmth. We would be going back at least twenty-five years if we deemed it necessary to place our patients in a state of hibernation for six or seven weeks to build up the "reserve force" so that they could withstand the ordeal of an abdominal section for a condition which, in most cases, calls for the simplest technique.

What is there easier and simpler in gynecological surgery than the technique necessary for a recent rupture of an ectopic tube. The only skill necessary is that no undue violence be used so that the broad ligament, which may be very friable, may not be torn, and that the ligature be applied tightly so that no further hemorrhage will take place and that too much time be not lost in trying to cleanse the abdominal cavity of its blood and blood clots.

In summing up, I would say that in the vast majority of cases of intraperitoneal hemorrhage from tubal rupture or abortion it matters but little whether we operate at once or defer operation for a few days. But in the class of cases termed cataclysmic, immediate operation with intravenous saline infusions, by an experienced operator, will be attended with better results than when operation is deferred for days or weeks.

IMMEDIATE *VERSUS* DEFERRED OPERATION FOR INTRA-ABDOMINAL HEMORRHAGE DUE TO TUBAL PREGNANCY.

By E. E. Montgomery, M.D.,
Philadelphia.

Charles D. Meigs, writing in 1848, said that he had seen three cases of tubal pregnancy, all of which died before the third month and that he would not expect any case so affected to live over the third month. He did not believe that a tubal gestation would ever be suspected until it had burst and begun to bleed. Further, "if a woman should experience the signs of pregnancy, such as change of the aureole, nausea, pica, and malacia, growth of the breasts, extraordinary sensations within the pelvis, etc., and thereupon, when having attained to the middle of the second, or to the third month, be seized with horrible pain in the hypogastrium and pelvis, turn pale, lose the pulse and faint, I should suspect the rupture of a tube-sac of extra-uterine pregnancy." He indicates other conditions, as typhlitic calculi or intestinal perforation, which may cause like symptoms, and proceeds: "But in case they should continue and increase, with signs of concealed hemorrhage, as to leave no doubt of imminent death, I think the diagnosis could not be other than a ruptured tube-sac of gestation. Such a diagnosis would not lead to any helpful therapeutic or chirurgical intervention, for nothing is to be done in these melancholy cases beyond the adoption of mere palliative measures. No man would be mad enough, under such diagnosis, to perform a gastrotomy operation, with the

expectation of finding in a tube-sac in the pelvis an embryo as large as a reed-bird." In the same year, discussing the same subject in his work on *Females and Their Diseases*, he exclaims: "What, alas! can we do in these cases? We could make an incision in the abdomen and clear away the coagulum and serum, but who is bold enough to do so? Who is he astute enough to discriminate betwixt all the possible causes of such phenomena with so much clearness as to warrant him in the performance of a gastrotomy for Fallopian pregnancy? There is no such wise and bold surgeon; and, therefore, nothing remains for us but to extend all to the relief within the narrow boundaries of our power and calmly await and submit to the inevitable end." Is it surprising that, under such hopeless circumstances, he should continue: "A physician may be calm and even cheerful, but a merry doctor is a very singular phenomenon." Thanks to the development of surgery, our horizon is a much brighter one.

Possibly, owing to the deleterious influence of advancing civilization on women, ectopic gestation occurs with much greater frequency than in the time of Meigs, but we no longer regard it as presenting a hopeless outlook.

The limits of this discussion do not permit me to consider the causes and varieties of ectopic gestation, but I must confine it to the significance of rupture and the general plan of treatment to be employed. The one ever-dreaded termination is that of internal hemorrhage, which may be slow and small in amount, or so profuse as to threaten life or even cause the death of the patient. Hemorrhage may occur in one of four ways:

1. It may be the result of rupture of the tube, either into the peritoneal cavity, when it is free and may be excessive, or into the broad ligament, when it is necessarily limited in quantity.

2. The development of the embryo within the tube so thins its walls that the chorionic villi may project through pinhole perforations and cause dangerous and continuous hemorrhage.

3. A partial separation of the embryonic sac may occur and hemorrhage fill the tube, escaping from its abdominal end and through the uterine end into the uterus. In this form the clotting takes place early in the tube and the quantity of blood lost is slight.

4. The fetus and its envelope may be forced through the abdominal end of the tube into the peritoneal cavity—a tubal abortion. This accident is not infrequently associated with very profuse bleeding.

In the four conditions above described the hemorrhage may be slight or very severe. The most active and threatening hemorrhage is most likely to be associated with the first and second divisions.

In the majority of cases of ectopic gestation the hemorrhage if untreated would not prove fatal. Very rarely, in the cases formerly supposed to have been cured by the systematic employment of the galvanic or faradic current, was the fetus alive at the time of the application, the fetus having already met death through the rupture of the sac. The symptoms regarded as diagnostic of ectopic gestation were those incident to rupture, as diagnosis prior to rupture was not then regarded as possible. The electrical treatment, consequently, was applied to the pelvic collection of blood resulting from the rupture, and the cure consisted in the removal or absorption of the clots. It was doubtful whether the absorption under the treatment was any more expeditious than it would have been had no treatment been employed. With the shock and diminished arterial tension incident to the rupture of a tubal gestation sac, the tendency to the formation of a clot, the probability of the arrest of hemorrhage is increased. In many cases this arrest occurs before a hemorrhage of any severity has ensued, and the patient so rapidly recovers from the indications of an internal hemorrhage as to leave the diagnosis in doubt. The amount of hemorrhage and its consequent danger will depend somewhat upon the site of the rupture and the existing condition. Rupture of a consider-

able-sized vessel, or over the implantation of the placenta, may produce a hemorrhage of such gravity as to lead to dissolution before any preparations can be made for an operative procedure. Bleeding from pinhole perforations of the chorionic villi may be so severe as to cause faintness, which recurs with every increase of the vascular tension until the life forces of the patient are completely sapped.

That fatal hemorrhage does occur from ectopic gestation has been too well demonstrated to admit of denial. The records of the coroner's physicians of all our large cities and the experience of many physicians has abundantly proved this. In such cases, prompt action will prove the sheet-anchor. It is just as important that the bleeding tubal vessel should be secured as if a vessel of equal size upon the surface were the cause of the hemorrhage. It is true that an external hemorrhage may be controlled by pressure or hemostatics, but such treatment would not be considered as good surgery.

Under the decreased tension from shock, the bleeding vessels of the ruptured gestation sac may become occluded by clot and further hemorrhage arrested, but the surgeon has no assurance that the favorite termination will result in the case under observation. Measures which would ordinarily be employed for rallying the patient from profound shock are reprehensible here, as the only hope for the patient outside of operation is with decreased vascular tension; the clotting of blood in the bleeding orifices will become so firm that it will act as an efficient barrier against further hemorrhage. Intravenous injections of salt solution, heart stimulants, or any measures to improve the circulation are unjustifiable until the bleeding vessel can be secured, as by endangering the displacement of the clot they increase the peril of the patient. For a similar reason the patient who has had a free internal hemorrhage should not be subjected to manipulation for diagnostic purposes. In these cases we must rely on the history and the visible physical signs, supplemented, if desired, by blood studies for the diagnosis.

IMMEDIATE *VERSUS* DEFERRED OPERATION FOR INTRA-ABDOMINAL HEMORRHAGE DUE TO TUBAL PREGNANCY.

By C. C. Frederick, M.D.,
Buffalo.

The necessity for a decision to be made between immediate and deferred operation for intra-abdominal hemorrhage due to tubal pregnancy is quite rare, or has been in the writer's experience, owing to the fact that diagnosis of the existence of ruptured tubal pregnancy by the family physician has been made late, seldom within the first three or four days after primary rupture and often as many weeks thereafter. Out of about 125 cases of ruptured tubal pregnancy, the writer has seen in only six cases the hemorrhage immediately following rupture large enough to endanger the life of the individual. Three were in extremis when first seen and were immediately operated upon, meantime using every possible means of stimulation to tide them over the operation. Operation was rapidly done, but all died in shock.

Having had such bad results in the first three, the writer in the fourth case decided to stimulate and wait. She also was in extremis, almost pulseless, ten hours after rupture. She did not rally, and died three hours after I first saw her. The fifth case was seen about two hours after rupture; patient's pulse was countable at 120; both heart sounds quite clear, but the patient was much shocked. Advised stimulation and normal salt solution subcutaneously. Patient

rallied for a time, but began to fail in another hour, and I, being busy with other work, another surgeon was called in and at once operated, saving the woman's life. A sixth case, operated upon about five hours after rupture, while suffering much from shock, made a good recovery.

It therefore appears from my experience that only about 5 per cent. of ectopic pregnancies are accompanied by a dangerous hemorrhage at time of rupture. In the remaining 95 per cent. as the result of shock and lowered vascular tension, together with the small size of the vessels torn, the bleeding is normally controlled, at least temporarily, by coagulation. Later, when vascular tension again rises and the patient begins to move about, the hemorrhage may and generally does recur. The writer has operated upon two cases in which hemorrhages had recurred at frequent intervals for five or six months respectively, the patients being about the size of normal pregnancy, the mass being composed of concentric layers of coagula. On the other hand, I have seen several patients in whom there was an undoubted rupture of a pregnant tube, with hematoma in the pelvis, in whom hemorrhage did not recur and who were not operated upon, and made perfect recoveries. The author has operated upon at least four women who had chronic pelvic lesions, following a clear history of unoperated former ruptured tubal pregnancy, in whom the remains of the ectopic gestation were found, some of them several years following the accident. All of these facts go to show that a very small percentage of ruptured tubal pregnancies is immediately dangerous to life from hemorrhage.

But the question still remains, when we are brought face to face with a rupture, Is this one of the 95 per cent. which will be self-limited, or is it one of the five which will kill the woman? The condition is much like acute appendicitis—we never know at the beginning what is going to happen.

Theoretically, we may consider these cases scientifically, by making an examination of the hemoglobin index frequently

and determine if the hemorrhage is progressive, at the same time having repeated counts made of the red blood cells to determine if they are diminishing progressively.

These procedures are not practicable under the conditions ordinarily encountered at the time these patients are seen. Theoretically, we ought to be able to determine accurately if bleeding is continuing; but, practically, we are not able to do so. It has always seemed to the writer that bleeding, whenever endangering a patient's life, if it can be controlled, should be controlled. It is a surgical principle from which it is difficult to get away. It therefore has always appealed to me to be good principle to open the abdomen in these cases as soon as seen, using all possible known means of stimulation during the operation; that is, if the patient's condition is one of danger; otherwise, if the patient does not show profound shock from hemorrhage, I should advise waiting until they rally.

It would seem, considering the results I had following immediate operation, that it was the wrong thing to do. I, however, believe that they all would have died if they had not been operated upon when I saw them. Undoubtedly, the large proportion of cases of rupture will do better if allowed to wait until bleeding ceases spontaneously; but I feel that there is a small percentage of instances, when the bleeding vessel is so large that spontaneous control is impossible, and in these immediate operation is the only chance to save the patient's life. We therefore are forced to the conclusion that no definite rule can be laid down for all cases. Each must be judged of according to the conditions present, remembering that there are ninety-five chances of the hemorrhage ceasing to about five of its going on to a fatal termination.

But we must not wait in these few cases until there is no vitality left upon which to depend during operation.

IMMEDIATE *VERSUS* DELAYED (EXPECTANT) OPERATION IN CASE OF ECTOPIC GESTATION.

By Egbert H. Grandin, M.D.,
New York.

In order to justify my position, allow me to state in brief the experience upon which it is based. My initial experience with ectopic gestation was when I saw the late Paul F. Mundé treat a number of subjects by means of electricity. This was the method then in vogue in this country. I recall well one of the instances when the late T. Gaillard Thomas was the consultant. The subject went into deep shock and required my attendance at her bedside for over thirty-six hours. She recovered, as, indeed, did all the others I saw subjected to this treatment. I question now if it can be maintained with a show of exactitude that all of these cases were instances of ectopic. In all justice to the observers of those days, let me remind you that abdominal section was then a rarity for any condition.

Imbued by this teaching, I proceeded to treat after this electrical fashion patients who came to me. In 1892 I saw a case of ectopic with the late Dr. Little, of Astoria, administered electricity, and the woman promptly collapsed. She recovered. Such experience set me thinking, and after fighting the subject out, particularly with our honored associate, Dr. Janvrin, I saw a great light, and from that day to this there has been but one treatment for this condition at my

hands, and this has been the surgical just as soon as the evidence of its existence was fairly presumptive.

It so happened that the very first opportunity I had to show my change of heart was on the woman referred to above as having been electrified for Dr. Little. I sent the woman to the French Hospital, and there performed the first deliberate abdominal section for ectopic ever made in that institution. I found an unruptured ectopic on the left, and a diseased tube on the right, the side I had presumptively cured of ectopic by means of electricity about two and one-half years previously. Since this time I have operated upon or been chief consultant at operations upon over one hundred instances, not including hematocele formation. Placing the number seen at 100, in order to secure definite percentage, the only instances which have died—two in number—were where expectancy ruled. I have no record of the number of hematoceles I have seen, but I recollect distinctly two deaths, the women reaching me in extremis, although the history pointed unerringly to the fact that abdominal section had offered distinct indication at least ten days previously.

Now, such being my personal experience, I shall maintain that prompt surgery should convert this malignant disease into one carrying the certitude of recovery, other things, of course, being equal. I shall also maintain that the ideal surgery is to operate before rupture. To go farther, I shall maintain that operation should be resorted to on presumptive evidence, it being my preference to be proved wrong in diagnosis rather than to sit on the fence awaiting the diagnosis made at the time of rupture. In three instances I have applied this rule, and whilst I did not find ectopic, I did find diseased tube and ovary. I shall further maintain that the only logical, safe, and surgical method of treating these cases is through the abdomen, the vaginal route being reserved for diagnosis and for hematocele formation.

In the latter event, hematocele, I shall maintain that, in the

absence of suppuration, and in the presence of requisite vitality on the part of the subject, the proper course is to open the abdomen and to exsect the damaged broad ligament. I have done this in a semitenement house with recovery.

Let me state that the instances I have seen and which form the basis of the above expressed views have been of all types, ranging from unruptured instances to those where the abdomen was full of blood even up to the ensiform cartilage. And let me further state that, if this discussion is to benefit us at all, and through us educate the general practitioner, it must be by the individual speaker and writer approaching it in the spirit which I am exhibiting, that of having firm convictions based upon ample experience.

From contact with other operators, and as the result of reading the views expressed in writing by still others, I believe that the points I have stated will find acceptance, the difference of opinion alone arising as to the choice of route—whether abdominal or vaginal. For the purpose of this discussion, I take it that it is intended to limit the essayists strictly to the question as to whether immediate or delayed operation should be the choice where active hemorrhage is in progress or where the subject is in collapse as the result of profuse hemorrhage.

Those who favor delay under such conditions argue somewhat as follows:

1. It is contended that the subject rarely dies as the result of the first hemorrhage. This is freely granted, but what means have we of determining that the hemorrhage has ceased? and how do we know that a second hemorrhage is not imminent? Often, and this I have proved in the operating room, the first hemorrhage is into the sac or perhaps consists of extrusion of a slight amount of blood into the cavity. This is often sufficient to cause collapse, not so much because of the amount of blood lost, as from the peritoneal irritation. Now, if we can reach the source of hemorrhage at this stage of the

game, before peritonitis and adhesions have set in, will any one gainsay that this is to the great advantage of the subject? Clinically, primary rupture, or primary abortion, is only a prelude to secondary hemorrhage. Applying the expectant treatment to instances of primary rupture, with the therapeutic measures which are naturally resorted to, we of necessity arise blood pressure and thus assist in causing secondary rupture. Therefore, from my point of view, operation should be performed as soon as feasible after symptom of rupture where we are unable to reach diagnosis before rupture.

2. It is contended that analogically subjects of hemorrhage from the stomach, or as the result of typhoid perforation or from uterine fibroids, rarely die at once. This is granted, but the analogy is a weak one, since the surgeons with whose work I am familiar, in case of typhoid perforation, for instance, are going to operate at once and not await a second perforation. Similarly, we should act in case of gastric hemorrhage; and as for fibroids of a hemorrhagic type, everyone is agreed that the earlier the operation the less the mortality rate, since the interstitial changes in the heart and kidneys are thus avoided. Repeated hemorrhages into the peritoneal cavity only render the operation more difficult and more prolonged, so that, other things equal, the longer we wait the lower should be the recovery rate.

3. It is contended that expectancy enables us to secure better surroundings, more instruments, more competent assistants. This is the argument of the pure hospital surgeon. I cannot gainsay the comfort derived from having all these attainments, but those present who have operated in tenements for this condition will agree with me that, however much such attainments may be desirable, they are not necessary. I am not afraid of surroundings, provided I can sterilize the field of operation. Few instruments are requisite; a trained assistant is not necessary. The surgeon having confidence in himself and his knowledge need only get into the abdomen,

tie off the damaged tube, and get out of the abdomen. "Tinkering" and "fussing" and "mussing" in the cavity simply render the prognosis very gloomy. The peritoneal cavity will take care of blood clots better than it will stand repeated insult from overzealous and unnecessary manipulation. After the bleeding point has been tied off, so to speak, then is the time for stimulation. I have thus operated from choice with the pulse over 160, and I have never regretted it as much as I have wept, metaphorically speaking, over the subjects brought to me after expectancy has ruled.

I am not denying the statements that many women have tubal abortion or slight rupture and recover without operation. I believe that many women abort from the tube with such transient symptoms as scarcely to attract attention. I am basing my argument purely on the feeling that the woman is far safer just as soon as she is placed beyond the risk of another hemorrhage, and I do not believe that a rapid incision, removal of the product of conception and its sac, carries so much risk or adds so much extra shock as temporizing in the absolute ignorance as to whether bleeding has ceased or not or may not at any time recur. My desire is that we should, like skilful generals, strike the first blow at the enemy, in this case, Death, and my own personal results and observation and thought teach me the value of decision and action as opposed to wavering and expectancy. In any other part of the body, in the face of hemorrhage, we do not wait for clotting and rallying, trusting to the element of luck that the hemorrhage may not recur. The same rule and for weightier reasons should be applied to the peritoneal cavity.

THE TIME TO OPERATE IN INTRA-ABDOMINAL HEMORRHAGE DUE TO TUBAL PREGNANCY.

By W. P. Manton, M.D.,
Detroit.

Not many years ago the dictum went forth that all cases of appendicitis must be operated on as soon as diagnosis was made. Riper experience and a closer analysis of cases and results have modified these views, so that today no surgeon of experience would for a moment think of following so restricted a rule of practice.

In attempting to answer the question as to the time to operate in ruptured tubal pregnancy we are confronted by a proposition somewhat analogous to that which occupied the attention of surgeons concerning appendicitis in the earlier days; the essential difference being that the former had been recognized and described during nearly a century and a half, while the latter has been known for hardly more than two decades. Our knowledge of tubal pregnancy has been one of slow growth, and the evolution of surgical technique has been more gradual. Lawson Tait, who did more than any modern operator to direct attention to the dangers of ectopic gestation, declared that he had "never seen an intraperitoneal hematocele that was not due to ruptured tubal pregnancy," but Werth and a host of others have shown that tubal abortion is a much more frequent cause of the blood escape than rupture of the tube. The conditions given by Antoine Petit in the latter half of the eighteenth century as pathognomonic

of tubal gestation are no longer considered worthy of attention, while the classical symptoms laid down for guidance in the text-books of only a few years ago have had to be largely overhauled, modified, and corrected in present-day literature. Atypical symptoms of misplaced conception are at present so frequently registered that, while certain manifestations may be taken as of positive evidence, the general and special expressions of the condition are often so obscure as to mislead even the most acute. Surgical intervention is not infrequently attempted too late, and the operation has to bear the onus of untoward results, or abdominal section gives the only means of arriving at a correct diagnosis. All of this goes to show that our knowledge of the symptomatology of tubal pregnancy is constantly changing and enlarging. With all the shifting diagnostic presentations, however, the original advice as to the method of treatment remains practically unchanged. It has been repeatedly pointed out that there are five stages of ruptured ectopic pregnancy in which the physician sees the patient and decides on the course of treatment to be pursued.

1. The so-called fulminating cases, in which the blood is poured out from lacerated vessels, the result of rupture of the tube or complete expulsion of the ovum from the ostium abdominale. These cases are associated with the evidences of large blood loss, preceded or accompanied by more or less severe pain, pallor, small thready pulse, profound shock and physical collapse.

2. Cases in which repeated attacks of pain are felt in the lower abdomen, together with faintness, possibly vomiting, and more or less shock and prostration, but in which the blood loss at any one time is slight; a condition which has been aptly described as "tubal drip." Such manifestations are not infrequently met with in partial rupture of the tube, or partial tubal abortion.

3. Cases in which rupture of the tube has taken place and a

hematocele has been walled off from the general peritoneal cavity.

4. Old cases in which the effused blood has been wholly or partially absorbed, leaving behind the products of conception surrounded by a more or less distinctly defined exudate.

5. Cases in which the products of conception, having escaped from the tube, continue to develop.

In the first instance it seems to me that there can be no reasonable question as to the proper method of procedure, the method recommended by Goupil more than fifty years ago, "stop the hemorrhage." In the best interests of the patient, therefore, the immediate operation is demanded in these cases.

It is well enough to say that, if left alone, the bleeding will cease of itself, and deferred operation can then be undertaken under more favorable circumstances. In many instances this is true, but it is not true in all, and the anatomical arrangements are not favorable to such desirable termination. Recent advances in our knowledge of the implantation of the ovum have thrown much light on this important point. The not infrequent records of cases in which the unfortunate woman has bled to death should deter from procrastination in this tragic event. Those who claim that death rarely takes place under the conditions mentioned should study the cases reported before the operative treatment of extra-uterine pregnancy was inaugurated. Goupil, from a large experience both before and after death in this condition, concluded that "all cases of intraperitoneal hemorrhage arising from extra-uterine pregnancy end in death." Parry gives the mortality under these conditions as about 68 per cent., with probably 53 per cent. due to rupture. Presumably the ectopic gestation of to-day originates in the same way and follows the same course, or would if let alone, as it did in 1848. If these observations are considered antiquated and doubt still exists, reference to current medical literature will

show yearly a sufficient number of fatalities from intraperitoneal hemorrhage incident to tubal rupture or complete tubal abortion to convince, it would seem, the most skeptical. In recent years many more deaths would probably have taken place but for the prompt and timely intervention of surgery; and the mortality following operation is steadily decreasing in the hands of the best operators under improved technique.

Are we justified, then, in assuming the responsibility of advising expectant treatment in these cases in the face of such threatening, grave dangers? I think not.

In the second class of cases, where the amount of blood is often small, but the extravasations are repeated, unless the patient can be kept under the most careful surveillance the sooner operation is undertaken the better. While it cannot be denied that the surgical procedure may often be deferred with possible safety to the patient, it is also certain that no one is in position to determine when a serious or even fatal hemorrhage may supervene, so that the sooner the dangerous and offending part is removed the better for the patient.

To sum up: In determining the course to pursue in the treatment of intraperitoneal hemorrhage due to tubal pregnancy, a rare judgment, fortified by experience, is demanded. While no golden rule will lead the surgeon to success, accumulated experience demonstrates that where there is free blood in the peritoneal cavity and hemorrhage going on, the sooner operation is undertaken the larger are the chances for rescuing the patient. It is literally true in the management of this calamity that "the man that wandereth out of the way of understanding shall remain in the congregation of the dead."

FORTY-ONE CASES OF TUBAL PREGNANCY, WITH TWO DEATHS.

By A. Lapthorn Smith, M.D.,
Montreal.

As a detailed account of each of these forty-one cases would be too tedious for a short paper, and as they have all been reported in the local medical journals from time to time as they occurred, I will only take up your time by describing the most striking ones, namely, the two which were fatal. I also wish to mention three other cases which came within my knowledge, but were not operated upon by me, and so are not included in this series of forty-one. When we consider that this condition was described in the eleventh century, but remained a pathological curiosity until twenty-five years ago, it is simply marvellous to watch the progress made during the last quarter of a century. To Lawson Tait, of Birmingham, we owe much for having pointed out that tubal pregnancy was never a medical but always a surgical disease. Although he confessed that it could never be diagnosticated before rupture, many of his disciples have improved upon his teaching, so that it is a common occurrence now to diagnosticate, or rather suspect, a tubal pregnancy and remove it before that tragic disaster happens. On this continent we owe a good deal to the vigorous teaching of one of Tait's pupils, Dr. Joseph Price, of Philadelphia, while many others of us, by reporting our cases, whether successful or not, have influenced the whole body of family doctors to keep the con-

dition constantly in mind, so that it is the exception for any of them to allow a woman to die with the condition unsuspected.

I lay great stress on the word "suspected." One of the greatest obstacles to the saving of life was the old, and, to some extent, very proper rule to wait until an exact diagnosis could be made before doing anything. If I am able to report forty-one cases, it is because I have induced a great many physicians in my neighborhood to abandon this rule and to set the life-saving machinery in motion the moment they *suspect* the condition. The first wheel in that machinery is a consultation with an abdominal surgeon, who, in turn, should take the next step, namely, to open the abdomen as soon as he has verified the suspicion. One of my two deaths was entirely due to my waiting for a more certain diagnosis from the third until the ninth month, instead of making an exploratory incision when the condition was first suspected by a practitioner who had already diagnosticated seven or eight cases, some of them before rupture, and everyone of whom recovered.

Professor Schauta, of Vienna, has recently collected a series of statistics covering a period of twenty years, showing that the mortality has been reduced from 87 per cent., in those cases which were not operated on, to 5.7 per cent. in those which were. My own mortality is exactly 5 per cent. Fifteen or twenty years ago practitioners were sometimes met with who were either skeptical about such a condition ever existing at all, or who did not believe in it enough to advise an operation before or even after rupture. Such men were a great menace to the life of any of their patients who might be going about with disaster overhanging them, so I have taken great pains to induce each one of them to be present at an operation when a gallon of clots and liquid blood was being scooped out of the abdomen of a dying woman, as after once having seen such a case they become quickly converted and begin to look out for such a case themselves. To give

an instance of skepticism: About twenty years ago I was called to the wife of a mechanic to attend her in labor at full time. On examination I felt the child's head through the vagina, and the uterus pushed up against the abdominal wall so that it could be clearly outlined by bimanual palpation. On telling the family that it was an abdominal pregnancy, and explaining what that was, and asking for a consultation with an abdominal surgeon, they promptly dismissed me from the case and put her in charge of a physician who had the largest practice in the city. He told them he had never heard of such a thing and that this was an ordinary labor and would terminate in the ordinary way. She had three days of severe pain without any baby, and then everything quieted down, and she was told that it was only a phantom tumor she had had. I followed her up for about three years and then lost sight of her. Another instance: About ten years ago a woman in the East End of Montreal was taken with severe cramps and fainting after eating heartily of some indigestible food. A neighboring doctor was called in, who pronounced it a case of indigestion, for which he prescribed an emetic. This brought up what she had eaten, but instead of improving her condition, she became so much worse that they dismissed that doctor and called in another of some reputation in medicine. He realized that her condition was serious, but thought that it was some acute nervous attack, as the woman was tossing about and crying out that she was dying. He called in an older man, who inquired about pregnancy, but as she had not missed a period, and, on the contrary, had menstruated twice in the last month, and was even then losing a little, he dismissed that proposition. His diagnosis was ulceration of the stomach. By this time the woman was really dying, and she received the last rites of the Church. Then and only then did they find a doctor who had tubal pregnancy always in his mind. Dr. Warren, one of my pupils, who was called, had assisted me at half a dozen

laparotomies for abdominal hemorrhage, and recognizing the condition at once, he gave up his practice for the whole day, overcoming the many difficulties and obstructions which are always thrown in the way of the man who proposes to do something out of the ordinary. When at last she reached the operating table she was pulseless, almost unconscious, and hardly required any anesthetic, so that her distended abdomen was hurriedly washed up and opened. The blood gushed forth, and each tube and ovary was in turn fished up and examined without finding the source of the hemorrhage. Then the uterus was brought up, and in the left cornu, just where the tube passed through the uterine wall, there was a ragged tear from which even then bright red blood was oozing. Inside of this tear was a cavity which would have held a gypsy nut, lined with a velvety, bleeding membrane, which was scraped out with the handle of a scalpel, and the bleeding was easily and quickly stopped by passing three or four running stitches of strong catgut under it, which completely shut off the blood supply. About five minutes more were spent in scooping out the blood and clots, about a gallon, no attempt being made to remove all the blood; a gallon of hot salt solution was poured in and the incision closed with through-and-through sutures. By the next day, although as white as wax, she was feeling well, and she made a rapid recovery. She has had several children since.

That I had the courage to operate on this and on two other women who were brought to the Samaritan Hospital moribund, I owe to a lesson I learned from Dr. August Martin during one of my visits to Berlin. I had left some special delivery cards with my address on them with the janitor of his immense private hospital in Elsásser Strasse, and one Sunday afternoon I found a hurry-up call to an operation. There was an apparently dead woman on the table, no pulse, and just barely breathing. Nevertheless he quickly opened and the accumulated blood spurted in the air. In a few

seconds more he had in his fingers the ruptured tube, which was feebly spouting blood. He clamped and tied, took out some clots, poured in some saline, and closed. I saw this woman walking about a few weeks later. The other case was almost as bad, but also made a good recovery. Since then there is no case so desperate that I have not been willing to open. I have mentioned that I have had three cases come to me that were not operated on by me; and I have described one as the false labor at full time. Now I will speak of another, which decided a question for me which was being discussed then, ten years ago, and is being discussed now, namely, when to operate. I was called out one frosty morning to one of the suburbs to see a very sick woman who, on getting up before six to prepare her husband's breakfast, was taken with cramps and fell fainting on the floor. Before I saw her, even while the words were coming out of the telephone beside my bed, I said to myself: That sounds like a ruptured tubal pregnancy. Nearly an hour later one look at her confirmed the diagnosis. She was deathly pale and anxious looking, and spoke in gasps. She thought she was two months pregnant by the feeling in her breasts, although she had had some irregular hemorrhages during that time. On examination the uterus was found empty, and a boggy mass could be felt on one side. She absolutely refused to go to the hospital, so I decided to operate on her there; but I made the mistake of going home to get a few instruments, instead of borrowing a knife and some catgut and a needle from the nearest doctor or druggist. When I returned in about an hour with a nurse and some instruments I found her gone; some friends had been summoned soon after I left and had called the ambulance of one of the hospitals, without asking her, and when it came she was unconscious again and could not object. So, although she was operated on and made a good recovery, she is not included in my list.

The third case, which does not appear in my list, was so interesting that I must say a few words about it. She was a woman who had been married six or seven years without any children, probably due to a gonorrheal salpingitis soon after her wedding. Her menstruation had changed from being very regular to coming on several times a month, and she had been suffering a great deal of pain in her side. A friend of hers, to whom she told her symptoms, and who was then attending my office for local treatment, advised her to accompany her there for an examination that evening. They came, but, unfortunately for her, I had just left for Philadelphia to spend a month with Joseph Price. On her return home, about 8 P.M., she proceeded to finish her ironing, but she never got that far, for on lifting the iron from the stove she was taken with a sudden pain and fell with a scream to the floor. The friend, who was still with her, ran out for the nearest doctor. He was a fine old gentleman, but had never heard of tubal pregnancy, so he told them she was dying from heart failure and that nothing could be done. When the husband arrived, about nine o'clock, he called in another doctor, a middle-aged man, who had heard of tubal pregnancy, but did not think of it in this particular case. But he came nearer to the truth, for he diagnosticated internal hemorrhage, and determined to have a postmortem next day. So she lay there slowly bleeding to death until 3 A.M., when she died. The abdomen was opened at 10 A.M., just twelve hours too late to save her life, and was found full of blood from a ruptured tube. Although she came to me I never saw this woman dead or alive, so she does not appear on my list. But I believe that if I had been home the tube would have ruptured while I was examining her in my office, and the abdomen would have been opened a few minutes later and in time to save her.

In justice to both these gentlemen it must be remembered that this occurred twenty years ago.

Lawson Tait thought and taught that tubal pregnancy could not be diagnosticated before rupture, but here is a case to the contrary: A woman came to my clinic at the Montreal Dispensary complaining of pelvic pain. As she had been ten years married without children, and I could distinctly feel the swollen tubes, I treated her twice a week with Churchill's iodine and boroglyceride tampons. She improved slowly, the tubes becoming smaller from week to week, until one day she stated that for the first time in many years she had missed her monthly period. I supposed that one of the tubes had improved so much under treatment that it had become pervious and allowed an ovum to pass into the uterus. The latter organ, however, did not increase in size as it should, but the left tube did, and as we were quite sure that she was pregnant, and I was equally certain that the pregnancy was not in the uterus, as the tube could be felt growing larger week by week until it was the size of a sausage, anybody could have diagnosticated this as a tubal pregnancy before rupture. About that time vaginal laparotomies were in vogue, and as I was doing a series of them I took this woman into the Samaritan Hospital, and, as she was exceptionally thin, I removed the black, sausage-looking tube intact through the vagina. The diagnosis was confirmed by one of our best pathologists. This case was easily diagnosticated before rupture, but in about ten other cases the condition was either only suspected or it was stumbled upon while following my rule: "If there is anything in the pelvis which should not be there, the sooner it is removed the better." Following this rule has converted many serious operations into very safe and easy ones. The best man living cannot always diagnosticate between appendicitis, a pus tube, and a tubal pregnancy before rupture, but if he feels an inflammatory mass in the right side of the pelvis he will make no mistake in removing it at the earliest possible moment. Thus it happened that one of my friends in a large suburb of Mon-

treal was called to a woman with all the symptoms of appendicitis, and he advocated operation. But her family would not consent until another doctor was called in consultation. He was more experienced in pelvic work, and after careful examination diagnosticated a pus tube. The friends thought that this was a serious difference of opinion, although he too advised immediate operation, and they demanded a specialist in abdominal work. I was chosen by the two doctors and the family, but the only conclusion I could come to was that they were both right; there was a mass as big as an orange in the right fornix pushing the uterus over to the left; there was tenderness over McBurney's point, and she had considerable vomiting. Immediate operation was advised, and I was asked to operate, which I did next morning in the presence of some twenty doctors attending the Canadian Medical Association. On opening the abdomen everything was matted together on the right side. After detaching the omentum and several coils of intestine, we came upon a mass of old blood clot, thus adding a tubal pregnancy to the diagnosis, which was afterward confirmed by the microscope. With great difficulty the ovary and tube were separated from the adhesions and then the appendix was found running into it. The appendix was left in its bed, the cecal end being cut off level with the cecum, according to my usual method of leaving no stump, and the specimen was shown to our society with an appendix five inches long still embedded an inch and one-half in the mass. None of us had diagnosticated the tubal pregnancy, but did we make any mistake in doing the operation? I think not. At least ten times have I opened the abdomen for a possible tubal pregnancy and found instead a twisted ovarian cyst with a hemorrhage of a quart of blood or a pus tube in it; but I was never ashamed of the mistake, because there is no other way to save thirty-eight out of forty-one cases. The man who never makes a mistake never makes anything. In every case of pelvic pain let us take a careful

history; let us make a careful examination; let us make an exact diagnosis if we can, but do not let us sacrifice the woman's life to our pathological pride. A tubal pregnancy is a malignant disease; its cells have the same power as cancer cells to eat into bloodvessels and cause fatal hemorrhage. Like cancer, it should be removed as soon as suspected; it is almost criminal in either case to wait for a certain diagnosis. In one of his recent papers, Dr. Henry C. Coe, of New York, gave a graphic description of a case of supposed miscarriage which he had been called to curette in a tall apartment house in New York. The woman who believed herself pregnant was taken with what she thought were miscarriage pains, after which she passed some membranes and blood. While Dr. Coe was curetting her she suddenly went into collapse. From the window he could see the roof of a great hospital in the next street. With great intuition he recognized the mistaken diagnosis, and that he had about an hour in which to save her life. He telephoned for the ambulance; within a minute it was dashing around the corner and fifteen minutes later her abdomen was open and the spouting artery tied.

One of my patients, sent to me by Dr. G. T. Ross, of Montreal, had an escape almost as narrow. She was a Jewish woman, who had been suffering for some weeks with pains and fainting spells, which her family physician attributed to some digestive disturbances connected with pregnancy, in which she believed herself to be three months advanced. As she grew worse and worse the family began calling more and more important doctors. The one before the last to be called was an old surgeon with a worldwide reputation, but especially favored locally for his diagnostic acumen. I have often heard him say that there was no excuse for an exploratory incision; but he was not reckoning on tubal pregnancy, for here was a woman bleeding to death from an obscure abdominal lesion for which this great abdominal surgeon had no help

to offer. The last to be called in when she was unconscious was this friend of mine, who is a well-known nose and throat specialist. But he had seen several abdomens opened which were full of blood, and he insisted upon the ambulance being called to take her to the Samaritan Hospital. I was in the middle of my second laparotomy that morning when she arrived, and I was urged to make haste, as otherwise there would be no third one. This was done, so that in ten minutes she was on the table getting a hasty scrub up. No anesthetic was needed; in fact, there was no pulse and just barely a little breathing. Only enough liquid and clotted blood was scooped out to enable us to find the ruptured tube and remove it, and she was hastily closed with through-and-through sutures. The foot of the bed was raised and several quarts of half-strength salt solution was allowed to flow very gradually into the rectum, but she only became conscious next day. She made a good recovery and has had a normal pregnancy since. One of the doctors present was so impressed with this case that he went out and brought in another one whom he had been attending for several days for some obscure pelvic trouble, and which proved to be a ruptured tubal pregnancy which Nature was trying to wall off. It would be in the interest of humanity if those who are doing these life-saving operations would endeavor to have half a dozen busy general practitioners present at each one, as I am convinced that a great many tubal pregnancies die unsuspected. Otherwise, how can we account for one practitioner meeting with nine cases and another six, while thirty or forty other practitioners in their neighborhood have never even suspected one case among them all?

How easy it may sometimes be to diagnosticate the condition is evidenced by a case to which I was called by one of my students. After one of my lectures on tubal pregnancy this young man came to the professor's room and asked me if I could come around to his lodgings in the next street, where

he said his landlady was ill in bed with exactly the same symptoms as I had been describing. On making a bimanual examination, I found the empty uterus pushed to one side by a painful mass on the other side. She was sure that she was pregnant after ten years of sterility. I was sure the pregnancy was not in the uterus; therefore, it must be in the tube. Operation at the Western Hospital next morning revealed a beautiful tubal pregnancy in a tube surrounded by adhesions due to the gonorrhea of ten years before.

How difficult the diagnosis may sometimes be can be inferred from the concluding paragraph of Boldt's exhaustive article on the diagnosis of extra-uterine gestation, and he has had an enormous experience in this line. He says: "While I have endeavored to outline the conditions which are likely to help in establishing the diagnosis of ectopic pregnancy, as a result of my own experience, I freely admit that even the most expert diagnostician cannot be infallible." I heartily indorse this, as well as a paragraph from Philander Harris' excellent article: "The failure to always differentiate tubal pregnancy and salpingitis is of little consequence, for the reason that the operation is undertaken in the interest of the patient, and while the abdomen is opened the pathology can be removed."

My forty-first case was just like Dr. Coe's above mentioned. Dr. Christie called me to curette a woman two months pregnant who took medicine to bring on abortion, and who thought she had succeeded, but that the placenta had remained. Before curetting I examined her under anesthesia and found a boggy mass in Douglas' cul-de-sac. Rectal examination showed the bowels and uterus to be empty. I diagnosticated tubal pregnancy, sent for the ambulance to take her to the Samaritan Hospital, where I opened her abdomen an hour later; a quart of clots, free blood, and an ovum as big as a walnut was found, which had eaten half-way through a knuckle of small intestine, which was bleeding furiously.

The tube was also bleeding freely. A few stitches stopped the bleeding from the intestine, and both tubes being diseased they were removed, and she has made a good recovery.

The difficulty in diagnosticating is greatly increased when an intra- and extra-uterine pregnancy co-exists. I had only one such case. The woman thought herself pregnant, but was suffering from severe pains in her left side, followed by fainting. Dr. Sylvester examined her, and finding a mass in the pelvis sent her to the Samaritan Hospital as a case of tubal pregnancy for operation. I felt the mass, but I also felt the uterus two months pregnant, so I was not sure that it was tubal. But I agreed with him that an operation was necessary, no matter what it was; for if it was a pus tube and not a tubal gestation it spelled disaster at or before delivery. It proved, however, to be a tubal pregnancy as well as a uterine one; the former was removed, and she miscarried with the other one a week later. She had a stormy recovery, but is now well. As a rule, an account of our fatal cases is more interesting and instructive than the successful ones. I had two deaths; one of them is of no interest, except that she was a Caughnawaga squaw and that she was sent to me by a full-blooded Iroquois Indian doctor, Dr. Patton, a conscientious physician, who never fails to act the moment he suspects some serious pelvic disease. The woman believed herself pregnant, but the uterus was too small for that, but instead there was a large mass in the pelvis pushing it to one side. She was very anemic, and I would have waited had I not been almost sure that it was a tubal pregnancy. On opening the abdomen I found about a quart of old and recent blood, which Nature had walled off very well with coils of intestine and omentum. The tube was bleeding slowly, and was removed. She was making a good recovery when an epidemic of la grippe struck the hospital, nearly killing the lady superintendent and several of the patients. There were more than a dozen serious cases, but they all recovered except the

Indian woman, who died on the eleventh day. Up to that time I had had twenty-nine cases without a death, and I had begun to think that I would never lose one. Then I had eight more recoveries before I had another death, of the thirty-eighth case, and this was a most interesting one. I have already mentioned that Dr. Sylvester had some special aptitude for finding cases of tubal pregnancy, having sent me seven or eight cases besides three others which he sent to other hospitals while I was away in Europe. About two years ago he sent me a case which he believed to be a tubal pregnancy. The woman, aged forty years, was married twenty years, but had never been pregnant, and had sent for him on account of a profuse hemorrhage by the vagina. He examined her, decided that it was an extra-uterine, and sent her to the Samaritan. I examined her very carefully several times and always felt a solid fibroid uterus in the middle line, but could not feel the ovaries and tubes, as she was very fat. I advised her to remain for a few weeks until she was in better condition for hysterectomy, as she was very anemic, but she went home promising to come back when the doctor thought her fit. She improved so much in the next few weeks that she decided not to have an operation, and a few weeks later, when the doctor examined her, he came to the conclusion that both he and I were wrong and that it was an ordinary pregnancy, although I still maintained that, although she was pregnant, it was in a fibroid uterus. At nine months labor came on, and Dr. Sylvester was called; he found her in furious labor, the os open big enough to put his finger in, but he could not feel any part of the child presenting; the pains were unusually severe, and he had to keep her relieved with morphine for three days. Then he gave her chloroform and thoroughly explored the uterus, which was double its normal size, but quite empty. He called me the next morning and repeated the anesthetic, and I had now no doubt that it was an abdominal pregnancy and that the child was still

alive. She was removed to the Samaritan Hospital, and after a brief preparation the abdomen was opened. There was no amniotic sac, and the child was floating freely in the fluid which filled the abdominal cavity. It was removed and was soon breathing nicely. But when I started to detach the placenta, which was attached to the back of the uterus and broad ligament and to the abdominal wall and to many coils of intestine, there was such a gush of blood that it was evident that she would be dead on the table long before the placenta could be removed, and I sewed this bleeding spot up again. I then attempted to find and tie the ovarian arteries, but I could not get near them in the broad ligament until first detaching the placenta. So remembering how in my first case the peritoneum managed to take care of the placenta and the child, I thought there was less danger to the woman if I left the placenta alone. I did not drain or leave the incision open, because here was a perfectly aseptic field with an organ, the placenta, which was no longer required, but which was most abundantly nourished, so that Nature could take her own time to absorb it. Although the baby appeared perfectly healthy, it died suddenly six hours later without any apparent reason. The mother appeared to be doing well, except that the vomiting was rather troublesome the first few days; and when it had stopped she could not be induced to swallow anything. She was fed with peptonized milk by the rectum, but gradually weakened and died on the ninth day, without any considerable rise of temperature. This woman's death was due to my delayed operation in spite of Dr. Sylvester's well-founded suspicion that it was a tubal pregnancy. The physical signs were those of a fibroid, but the history was that of a tubal pregnancy. Someone has said, "When in doubt operate." If I had followed that rule in this case, as well as in half a dozen chronic cases of appendicitis, I believe that there would have been that many more people alive today.

IMMEDIATE *VERSUS* DEFERRED OPERATION FOR INTRA-ABDOMINAL HEMORRHAGE DUE TO TUBAL PREGNANCY.

By H. J. Boldt, M.D.,
New York.

Whether an operation for intraperitoneal hemorrhage from ectopic pregnancy should be deferred, or be undertaken immediately, must depend on the judgment of the individual physician, based on his personal experience, and also on a careful study of the experience of others.

I think that we are agreed that physicians do not assign the same degree of seriousness to any particular condition in a specific patient. I shall, then, on this occasion give my own views based upon personal experience, with a careful consideration of the subject.

Permit me to premise my remarks with a statement of what I mean by a primary hemorrhage from ectopic gestation, and what by a secondary intraperitoneal hemorrhage.

Let us assume that a tubal pregnancy patient shows no noticeable symptoms of the faulty impregnation until suddenly an extensive tubal rupture occurs, which causes complete collapse, evidenced by absence of the pulse at the radial arteries, with the other signs of a sudden and profuse loss of blood. The shock may be so severe as to cause absolute unconsciousness. This is what I call a primary hemorrhage.

Assume another patient with ectopic gestation, who has experienced the symptoms that usually accompany a typical case

of tubal abortion, or of partial tubal rupture, with the symptoms of an intraperitoneal hemorrhage. She is not in collapse, however, although her pulse may be very small and rapid, and her appearance that of acute anemia. Her mental faculties are perfect, or so nearly so that she may give the physician intelligent answers to his questions. She improves with rest, and after a day or two her general condition will have improved materially. Then another attack comes on, which will cause collapse as the result of intraperitoneal hemorrhage. The collapse is not, however, caused by the primary hemorrhage, but by the secondary bleeding.

An analysis of the cases in which there was profound collapse from intraperitoneal hemorrhage, but in which nothing in the history pointed to previous intraperitoneal bleeding, shows that by far the greater majority rally from the bleeding sufficiently to come well out of the shock.

To operate upon a patient in profound collapse from a primary hemorrhage is, in my opinion, a mistake; because with proper treatment the patient may rally in the course of a few hours. While it is a fact that some patients do not rally sufficiently for us to operate upon them in their improved condition, we may be able to judge of this during the interval from the first sight of the patient to the time when she is prepared for the operation. My own experience has been that in such patients bleeding is renewed within a few days, or even sooner. In waiting for an improvement in the condition of the patient, we must remember that a betterment of the pulse quality also brings increased blood pressure and the danger of renewed intraperitoneal hemorrhage. An operation should not be deferred in patients with active symptoms of partial tubal rupture or tubal abortion. The sooner they are operated upon the better.

Now to the point I desire to make: If the general condition of the patient evidences a slight betterment, we should *not* operate then, but wait until the patient has more fully recu-

perated, if this seems likely. The fact that the surgeon, assistants, and nurses, with all the other requirements, are in readiness, is no excuse for jeopardizing the chances of the patient by operating too soon; since the added shock of the operation, no matter how rapidly or dextrously done, does lessen the chances of a favorable outcome. It is more rational to wait for three hours or more, until the patient's condition has improved so markedly, judging from the pulse, respiration, condition of the skin, and mental condition, that a rapid operation can be done with comparative safety. It must be insisted upon, however, that all the requirements for an *immediate* operation remain in readiness, so that should renewed bleeding be indicated by increase of the pulse rate, with lessening of its volume, and, perhaps, other symptoms of renewed sinking, operation may be done at once. The preparations should be such that this can be done within twenty to thirty minutes from the first signs of renewed bleeding. It is of the utmost importance that the intervention should be done in the shortest possible time, not exceeding fifteen minutes in all.

These patients should have a tight bandage put on the upper part of both thighs to act as a tourniquet, transforming their lower extremities into a blood reservoir, and an intravenous infusion should also be begun as soon as they are placed upon the operating table. Strychnine should not be overcrowded; one injection of 25 mg. suffices, and then one or two injections of camphor of 0.25 cg. may be used at intervals of two hours.

No time should be lost in looking for the embryo, or in washing out the abdomen. Get out the readily accessible clots and dip the bulk of blood out rapidly with the hand, leaving the rest; pour into the abdomen a pitcherful of saline solution, leaving it to be absorbed with the blood that has been left. In such cases no "fancy work," such as implanting the ovary in the uterine cornu, is permissible. Rush the

work without bungling. Such procedure should also be employed when improvement in cases of primary hemorrhage does not take place.

My preference is not to transport such patients to a hospital, but to operate upon them in their homes, because of the increased danger caused by the transportation.

How long shall we postpone the operation if a patient does rally? Not at all if she has really rallied; when she has a fair pulse, is perfectly intelligent in her answers, and has a normal skin. To wait longer is to assume risks for her, which we have no moral right to do.

Are there cases of intraperitoneal hemorrhage in which operation may be deferred, or may be entirely omitted?

This question can be answered in the affirmative. Let us consider a patient who, from the symptoms and local findings, is the subject of an ectopic gestation. Examination determines the presence of an hematocele of moderate size. Her general condition is good. Active symptoms of progressive abortion or partial tubal rupture have ceased for one or more days. Under such circumstances there is no necessity for immediate surgical intervention. Such a patient should be placed in an institution where she may be kept under constant, competent observation. Many such cases make an uninterrupted recovery without operation. But such patients should be kept under constant supervision, so that they may be operated on immediately should intraperitoneal bleeding recur, showing that the process of abortion has not terminated.

It is claimed by some that, when bimanual examination shows no tubal enlargement, a complete expulsion of the ovum from the tube can be diagnosticated. I consider this improbable in most instances, because of the risk incurred on making an accurate bimanual palpation. Furthermore, even if the ovum has been expelled from the tube, the possibility that bleeding may occur cannot be excluded, owing to the

loosening of thrombi from bloodvessels in the tube, especially due to traumatism in making the examination.

Should symptoms occur at any time that lead us to believe that intraperitoneal bleeding is renewed, we must no longer delay operation, because with a patient in favorable condition the mortality from operation is very low, perhaps less than 5 per cent.

IMMEDIATE *VERSUS* DEFERRED OPERATION FOR INTRA-ABDOMINAL HEMORRHAGE DUE TO TUBAL PREGNANCY.

By J. E. Janvrin, M.D.,
New York.

The wording of this subject permits a pretty wide field for discussion. It takes in all varieties of hemorrhage due to tubal pregnancy—whether the hemorrhage is *very* slight, as frequently occurs in unruptured cases; whether it is moderate in amount, due to partial or slight tears in the tube wall, or to a slowly but steadily progressing tubal abortion; or whether it is of large amount, due to a more extensive laceration of the tube, or to a rapid tubal abortion accompanied by profuse hemorrhage and excessive shock.

Since the topic is presumed to be confined to the operative treatment, it is necessary to have somewhat of an understanding as to the actual conditions existing in each variety of impending or actual hemorrhage, and also as to the conditions existing in each individual case, as far as our ability in diagnosis permits. I would like, therefore, to speak first of the unruptured variety. It is generally conceded that practically every case of extra-uterine pregnancy is at first tubal in character, and it goes without saying that every case of tubal pregnancy during its early stage is an unruptured affair.

Provided we can recognize such cases, what should we do with them?

In Vol. XI of the TRANSACTIONS of this Society, published in 1886—twenty-two years since—I reported a case of tubal pregnancy (which I treated with galvanism, when seven weeks advanced, on three successive days) and in which the sudden death of the patient occurred on the morning of the day following the last application of galvanism from a severe hemorrhage from a rupture of a small artery on the peritoneal covering of the tube.

There had been, some nine days previously, symptoms of a slight internal hemorrhage, accompanied by colicky pains and some shock, and I had diagnosticated the case as tubal pregnancy, and *that* was the time when I ought to have done laparotomy; but, going according to our light at that date, I had kept the patient perfectly quiet in the meantime, and at the end of the nine days had applied galvanism, deeming it perfectly safe to do so. The postmortem showed extensive hemorrhage from a slightly torn artery on the peritoneal surface of the tubal sac, but *no rupture* of the sac wall. At that date I was able to find only two similar recorded cases—the first being that of Ollivier's (d'Angers), and mentioned in Parry's work on *Extra-uterine Pregnancy;* and the second, reported by the late Professor T. Gaillard Thomas, in the TRANSACTIONS of this Society for 1882. Both cases had succumbed, like my own, simply to the hemorrhage resulting from a minute hole in the wall of a small artery on the peritoneal surface of the gestation sac without any tear of the sac wall.

In concluding the report of these three cases, I urged the absolute propriety and necessity of opening the abdominal cavity "as soon as the diagnosis of tubal pregnancy could be reasonably made, and the removal of the unruptured tube with its contents." I have never been able to find that this had ever been recommended before that date, although for some thirty years prior laparotomy for a free hemorrhage accompanied by shock and symptoms of impending death had been urged, first by Professor Kiwisch, in 1857, and again

by the late Dr. Stephen Rogers, of New York, in 1867, and in 1880 by Professor Thomas, of New York, and by Mr. Lawson Tait, in 1883, when he did the first laparotomy for a fully ruptured tubal pregnancy.

At the January (1887) meeting of the Obstetric Section of the New York Academy of Medicine, when the subject of tubal pregnancy was under discussion, I closed my remarks by saying that "in any case in which from the rational and physical symptoms I became convinced that I had to deal with a tubal pregnancy, *even before* symptoms of a rupture in the peritoneal covering of the tube occurred, I should most earnestly urge laparotomy and perform it if I could obtain the consent of the patient. Even if mistaken in my diagnosis, I should find something which ought to be treated surgically."

On April 16, 1888, I read a paper before the Medical Association of the County of New York, taking the same ground, and in September, 1888, I read a second paper before this Society, urging the propriety and giving the "Indications for Primary Laparotomy in Cases of Unruptured Tubal Pregnancy."

The symptoms given in all of these papers were practically as follows: The presence of an irregular decidual discharge, in a woman who had missed a period, associated with the normal signs of pregnancy and an enlarging, generally fluctuating and exquisitely sensitive mass upon one side of the uterus, and attacks of "colicky" pains, accompanied by more or less shock, usually quite severe.

I have had several such cases since then and have found several reported by others, and personally I have never had occasion to repent operating at once.

Shortly after my remarks made in January, 1887, several successful cases of the removal of the unruptured tube with its contained fetus were reported, one by Dr. J. S. Hawley, of New York, one by Dr. Howard Kelly, one by Dr. Joseph

Price, and one by myself. Finally, in the April (1888) number of the *American Journal of Obstetrics*, over a year and a half after I had first urged laparotomy as soon as a reasonable diagnosis was made, and before any rupture of the sac had taken place, and I had given all of the needed train of symptoms to recognize the situation, Mr. Lawson Tait said: "If there be any reasonable supposition that there was a tubal pregnancy which had not yet ruptured, I should recommend immediate operation."

This much for the early history of laparotomy for unruptured tubal pregnancy. I believe that all gynecologists during the past fifteen years, at least, have fully indorsed the views set forth in my papers of 1886, 1887, and 1888, and have operated whenever the early diagnosis was reasonably certain.

What are the practical conditions obtaining in a case of *ruptured* tubal pregnancy, or in a rapidly impending tubal abortion? The symptoms have been so frequently described during the past twenty years or more that it is not necessary to dwell upon them at any great length. In every case we have the history of local colicky pains, irregular vaginal discharge, cessation of the menses for one month at least, and the sudden and well-recognized symptoms of internal abdominal or pelvic hemorrhage accompanied by severe shock. The enlargement and exquisite sensitiveness of the Fallopian tube which was noticeable before rupture of the tube or tubal abortion had taken place no longer exists, but we have in their place all the evidences of extravasated blood in the pelvic cavity. The situation is so easily recognized by any surgeon or physician of experience that it is almost impossible to make a mistake in diagnosis.

Under such circumstances, what is the best course to follow? Shall it be immediately or shall it be deferred laparotomy? I take it for granted that we are all agreed that laparotomy is the only proper treatment.

The number of my own cases, though not as large as those

of some other operators, has been sufficient to convince me that when once the diagnosis has been made there should be no delay in opening the abdomen. On two occasions only have I delayed the operation, and in each of these (although in one case it was only six hours and in the other nearly twenty-four) the patients were in decidedly worse shape than when I first saw them. One was a case of tubal abortion, the other a case in which a tear in the wall of the sac about an inch and one-half in extent existed. In each case I was prevented from operating immediately by the husband not being willing to give his consent until even he could see that the patient was rapidly sinking. Fortunately, they both recovered. The condition in such cases is the detachment of the fetus and placenta, especially in tubal abortions; and the death of the fetus quickly follows. From the instant that hemorrhage begins the mother's life is in most imminent danger, and in a large percentage of the cases, unless laparotomy is performed at once, recurrent hemorrhages, more or less severe, take place increasing the already terrific danger under which the patient is laboring. Add to this the fact that the fetus and placenta have become foreign bodies in the mother's abdomen which must be dealt with later on under less favorable conditions, and we have before us a situation demanding, in my judgment, immediate laparotomy. The only item which could militate against it is this, viz., that a good gynecological surgeon is not at hand to perform the operation. Under such circumstances, it may be, and probably is, proper to wait a few hours until such a surgeon can be found.

No doubt all of us who have had experience in the treatment of ruptured tubal pregnancies have met with such instances. I have had several in localities not far from New York, and, although fortunate enough to have saved the patients, I have always felt that if the operation could have been done a few hours earlier it would have been a decidedly

less tax upon the strength of the patient and upon the nerves of the operator.

In the paper which was read by Dr. Hunter Robb at the meeting of this Society in Washington last May, there are reported twenty cases of deferred operation, ranging from one to twelve days. In only five of these were evidences of shock noticed—an unusually small percentage. Two of the twenty gave evidences of "adherent pelvic structures" when discharged, and one other died on the tenth day after operation from "volvulus and intestinal adhesions."

When the laparotomy is done immediately, there is practically no possibility of "adherent pelvic structures" or "intestinal adhesions" resulting. The lacerated tubes, together with the placenta and fetus, when found, and the blood clots with a large part of the fluid blood, are quickly removed, and with a small amount of manipulation, and we have left nothing behind except a little fluid blood and possibly a minute fetus which had escaped into the pelvic cavity before the operation was begun, neither of which items gave any subsequent trouble, they being taken care of by the absorptive powers of the peritoneum. A rapid operation adds very little to the existing shock, and that little can be easily counterbalanced by the intravenous or subcutaneous use of the saline solution should the conditions demand it.

I fully believe that a more decided shock and loss of power for reaction from the operation is sure to follow in cases in which the operation is deferred, whether it be for twelve hours, a full day, or longer. Such, at least, has been my own experience and observation.

WHEN SHALL THE OPERATION FOR TUBAL PREGNANCY BE PERFORMED?

By B. F. Baer, M.D.,
Philadelphia.

There is no more dangerous disease, excluding cancer, to which a woman may be subjected than an undiscovered and unaided extra-uterine pregnancy. When the inevitable tubal rupture or abortion occurs the accident may become appalling, for the patient may die from hemorrhage before aid can be secured. Fortunately in the vast majority of cases ample warning is given, so that the alert physician may recognize the danger. Like the grazing herd which instinctively turns toward the shelter when there are signs of a coming storm, the subject of an extra-uterine pregnancy often has early symptoms which cause her intuitively to seek the aid of the physician and places upon him a responsibility which must be promptly met, for delay may result in disaster.

Some years ago a lady, aged twenty-six years, who had been married six years, and had never been pregnant, called one Friday at the office of her family physician and said that she had a little irregularity and felt that something was wrong. She had a slight discharge of blood, with some unusual pain which was not the way her menses usually appeared. The doctor was busy, and said, "I will see you tomorrow. Do not worry about it." On Saturday she sent for him, and he found her a little worse, but did not make an examination, and lost the golden moment. He did not realize that the

slight metrorrhagia and pain were Nature's distress signs, calling for the prompt exercise of his diagnostic skill, the physician's supreme gift. On Sunday he was again called and found the patient in collapse. And now the doctor and everybody except the patient was awake. During all that night frantic efforts were made to get someone to operate; and when I arrived next morning at the station, the doctor, in great distress, exclaimed, "I fear we are too late!" We hurried to the house and when I entered the room the patient, pale as death, gave a slight gasp, and was dead.

On Friday this patient had congestion of the tube, a threatened rupture, and the slight bleeding was the sign; on Saturday a little more; and on Sunday evening there was complete rupture.

Some time later a physician three hundred miles away requested me to come on the next train to operate upon a case in abdominal collapse. The next train was to leave five hours later. Before this time arrived I received another message: "Do not come. Death." A letter a few days after informed me that the case had been one of ruptured tubal gestation, the first symptoms having occurred several days before, but that they had not been regarded seriously until the final attack, to which the patient succumbed.

Within the same month, one hot Sunday in June, a message reached me while in the country, requesting me to come at once to Quakertown, forty miles away. The patient was in collapse from abdominal hemorrhage. By the time I arrived it was dark. The surroundings were unsanitary, and there was only lamplight. The doctor had been using stimulants, and the patient had commenced to rally. The pulse had returned at the wrist, but was very rapid and feeble. The patient looked profoundly anemic. The first attack had occurred on Friday. She rallied and went to a picnic on Saturday, against the doctor's strenuous admonition. She was brought

home in semicollapse, but revived, and it was thought the trouble was over in miscarriage because there had been an expulsion of membrane from the uterus. As the patient seemed to be improving, I advised waiting until daylight, hoping to better the conditions for successful operation. But doctor, husband, and family were clamoring for action, and I was influenced to immediate operation against my judgment.

The patient died two days later because the operation was performed under circumstances and surroundings which were most unfavorable. Moreover, it was shown that the bleeding had ceased, that the hasty step was not necessary, and that it doubtless destroyed the only chance left.

Last year I saw, with Dr. J. S. Baer, of Camden, N. J., Mrs. H., aged forty-two years. One morning he was hurriedly called and found the patient suffering from severe abdominal pain. While cooking breakfast she was seized with a cramp in the left iliac region and fell in a faint. Her pulse was below 100, of good volume, temperature and respiration normal. There was little pallor. Examination revealed a small tumor, posterior to left broad ligament. A diagnosis of extra-uterine pregnancy was made and operation advised. This was refused. She was ordered to remain in bed. The next morning she arose and, while lifting a mattress, had another attack, not so severe. He again urged operation, but she again refused. He asked for a consultation and threatened to withdraw from the case. I then saw the patient and gave further testimony to the urgent necessity for operation, but she still declined. The next morning she had another attack, more severe. She now realized her critical condition and consented to operation, but she was almost immediately in very profound collapse. Her husband begged that operation be done at once, and the doctor acted. An incision was quickly made and the vessels clamped. Although intravenous

and other means of restoration were used, she never reacted, and died about twelve hours later.

On the reverse of this dark picture there is a bright side, for there is no operable abdominal disease which is more easily and safely terminated than ectopic gestation, when managed scientifically.

All of the above related cases could easily have been saved if operation had been done when the first symptoms presented. If any truth has been established by our large experience in this disease, it is that death almost never occurs in the first attack.

The only proper treatment for extra-uterine pregnancy is operation by abdominal section as soon after the disease is discovered as the condition of the patient and the environment shall make it safe; before rupture, if possible. That is settled. The sole question on which there is any difference of opinion is: Shall we always operate immediately if the patient is in profound collapse when first seen?

This question will be always open and unsettled in discussions such as this, for it must be decided in the presence of the individual patient. Here, probably more than anywhere else in surgery, is a place where calm judgment and experience is most important. I believe that it will be better to give a little time for the patient to rally rather than to rush upon the scene in the so-called "penknife operation" state of mind. I believe that more patients will be saved by the plan which gives time enough to secure a proper environment and such restoration of the vitality as may be required to withstand the additional operative shock. I believe I have saved lives from such a course that would have been inevitably lost if I had immediately operated with the patient still in collapse. Of course, the usual restorative remedies and the preparation for operation are progressing meanwhile. If, then, the patient is not improving she is probably doomed,

and operation would only serve to hasten the end and thus cut off her last chance for life. Remember, I am now speaking of *profound* collapse, when the patient is almost dead when first seen, when she has entered that twilight region where Nature is struggling to maintain life, where the bleeding has probably ceased, and where she is feeding and refilling the vessels with the blood serum from the peritoneo-clysis which the hemorrhage had produced. Here, I maintain, ripe judgment will often stay the hand long enough to see more clearly, and to improve the conditions and surroundings. It will be soon apparent whether Nature has closed the vessels, in improvement of the pulse. And if the latter is true, harm would probably result from immediate abdominal section, for the blood-serum absorption would then be arrested, pressure removed, Nature's recuperative plan disarranged, and the feeble life-flame could easily be forever extinguished.

My last case, operated upon a week ago, while walking in the street fell and became unconscious. When I saw her some hours later, although urged to operate, I refused, because she was apparently moribund. Restorative measures, beginning with morphine sulphate $\frac{1}{4}$ gr. hypodermically, gradually helped her to revive, and some days later operation revealed the pelvis and lower abdomen filled with the usual blood clots and embryonic debris.

I, and doubtless many of you, could relate case after case of somewhat similar character.

Furthermore, shock is not always due to blood-loss, and hasty operation has more than once proved that it was not necessary on account of continuing hemorrhage. My very first case of ectopic gestation convinced me of this fact, and I have seen others since.

In the pioneer days of pelvic surgery, in 1883, I saw, with Dr. James A. Ogden, of Paschalville, Mrs. P., aged thirty-seven years, who had been married six months before to her

third husband, but had not previously been pregnant. She had menstruated last in April, and had begun to complain toward the end of July of cramps in the left iliac region and of slight metrorrhagia, and later had a sudden "terrible pain," said she was dying, and became unconscious.

After a few hours she was better and walked about the room, when she was again seized. She remained in bed in a prostrated state for days, then got up and went about her duties. Two days later she was again attacked and was very ill for several weeks, but was kept under the influence of opiates until I first saw her on August 20.

Physical examination showed a tumor which displaced the enlarged uterus to the right, forward and upward. The tumor was smooth on the surface and large enough to fill the left pelvis. It was very painful at one or two points and obscurely fluctuating. The mammæ and nipples showed markedly the changes due to early pregnancy. I made a diagnosis of unruptured ectopic pregnancy and advised operation, which was done several days later by vaginal section with the hot Paquelin knife, following the then practice of our late distinguished Fellow, Professor T. Gaillard Thomas. I lost my patient five days later, because, in the light of our after experience, this technique was a mistake. When I again operated, it was by abdominal section, as I have done in all of the cases since, and they all recovered except the Quakertown patient, related above. But to the point I wish to make. The operation and the autopsy revealed that the repeated attacks of shock were not due to hemorrhage.

On August 21, 1893, Mrs. N., who was under the care of Dr. S. Solis Cohen for some throat affection, while returning from the toilet was seized with sharp pain above the left groin. She immediately lost consciousness and fell forward, striking the floor with such force as to fracture her nose. She was very pale and the pulse was feeble, having been absent at the wrist for some time after she was placed in bed.

When Dr. Cohen saw her, shortly after, she had somewhat revived, but was still in shock. Dr. Cohen was at a loss to account for the sudden and violent symptoms, but thought of a ruptured ectopic sac, and hence asked me to see her two hours afterward. The patient was now able to answer that she did not think she was pregnant, as the catamenia had been regular. Vaginal examination, however, revealed a mass the size of a hulled walnut, posterior to the left broad ligament. The tumor was not fixed, but quite tender on pressure. The uterus was in normal position, and seemed slightly enlarged. There were not any physical signs of hemorrhage; however, a diagnosis of tubal gestation was decided upon and the belief expressed that the shock had not been due to hemorrhage from rupture of the sac, but to pain, and that rupture was imminent. Operation was advised, but as the patient was not bleeding and was rallying from the shock, it was decided that she should be constantly watched and time given her to regain the lost strength. She was kept quietly in bed and in a condition suited to one who might be subjected to laparotomy on a moment's notice. She gradually improved from day to day. We were in the midst of a Philadelphia hot wave, and therefore waited longer than we otherwise might have done.

On September 2 abdominal section showed the left Fallopian tube enlarged to the size of a small orange, unruptured, and there were not any signs that hemorrhage had occurred at the time of the shock. The tube, containing a four weeks' embryo, was removed, the patient making an afebrile recovery.

Extra-uterine pregnancy is a surgical disease, and operation is always indicated, but conditions should govern in deciding when and where the operation shall be done.

In the early recognition of Nature's distress signs, metrorrhagia and pain, and in prompt operation before complete rupture and collapse has occurred, lies the safest course.

If profound collapse exists, as a rule it will be safest to bring about restoration and to improve the environment before operating.

DISCUSSION ON THE PAPERS OF DRS. SIMPSON, KRUG, VINEBERG, MONTGOMERY, GRANDIN, MANTON, SMITH, BOLDT, BAER, JANVRIN, AND FREDERICK.

Dr. August Martin.—I have been very much interested in this symposium. As to whether we should operate in cases of ruptured ectopic gestation, I do not think we need to be in a hurry to do so if bleeding comes to a standstill; but if bleeding continues, then we should follow the old surgical rule to interfere to stop it. Whether the operation should be done at the residence of the patient or at a hospital will depend very largely upon the circumstances; but it is always preferable to operate on these patients at a hospital. If the case is urgent we should not hesitate to operate at once, and by the abdominal route.

Dr. Seth C. Gordon.—In 1886, at the meeting of the British Medical Association, held at Brighton, Lawson Tait said: "I don't believe any man living ever made a diagnosis of extra-uterine pregnancy before rupture." Three or four men doubted that statement in his presence, when Tait said: "Gentlemen, you may think you have, but I don't believe it."

On September 24, 1887, a pupil of mine telegraphed me that he thought he had a case of extra-uterine pregnancy, and wished me to be ready to come at a moment's notice. In two hours he telegraphed me: "Rupture has taken place; come at once." It was twelve hours from the time he first telegraphed me until I arrived there. On opening the abdomen I removed at least four quarts of clotted blood, and a fetus about ten or twelve weeks old. The woman made a good recovery without any trouble whatever. It was then supposed that this was the first successful case of extra-uterine pregnancy operated on in this country.

Thomas wrote me at the time saying: "It is the first successful case, and I congratulate you." It was afterward proved that one of our members, now dead, Dr. Johnstone, then of Danville, Kentucky, had operated in September or October, 1886, for the same condition and saved his patient.

Singularly enough, in the next three cases I had, one was three months after rupture, one thirteen weeks after rupture, and another about eight weeks after rupture. It so happened that all of the cases, with two or three exceptions, I have operated on were cases in which rupture had taken place. I have had only two cases when I made the diagnosis beforehand, and then without any bleeding whatever, not even from the vagina. I operated at once and they all recovered. In three cases I operated through the vagina, while the rupture had evidently occurred seven weeks before, and there was clotted blood. I opened freely through the posterior cul-de-sac, washed out the cavity, and the patients made good recoveries. So far I have had no deaths following one of these operations, and, as a rule, I should certainly wish to be classed among the conservative men who prefer to wait rather than to operate on a case of immediate collapse, where we are satisfied that the collapse is due to hemorrhage. I cannot agree with those who seem to consider that the shock which accompanies hemorrhage is a different thing and is a plus element in the case. I believe shock is due to hemorrhage. The shock may come when you operate on such a case. You may have a certain amount of shock due to operation, but what we term shock in these cases to my mind means hemorrhage as it does nearly always in all surgical operations.

Dr. E. W. Cushing.—It is now twenty years since my attention was first called to this subject by a case in a near relative. At that time I photographed all the specimens on record which were at the Harvard Museum, and which were put up by the late Professor Jackson with great care. I only wish to call attention to a few points, one of which was referred to by Dr. Boldt at the end of his paper, and that is there are more cases perhaps than appears from this discussion of tubal abortion in which some of the symptoms are not well defined. Those who are old enough to have had cases to treat before operation was undertaken will remember

a good many cases of so-called pelvic hematocle which used to go along and get well. I very much doubt whether women have tubal pregnancy any oftener today than they did in 1888. Merely because some of these patients have died I do not advise the general practitioner that every case should be operated on immediately. However, in my immediate vicinity the general profession is now keenly alive to the subject of tubal pregnancy, and I repeatedly see cases a day or two after the first symptom where there has been apparently hemorrhage due to tubal pregnancy. A woman is perfectly well, and it is a question when the symptoms are rather indefinite whether to operate immediately or not. I believe in operation, and yet I have seen several cases where the symptoms were usually comparatively slight and obscure, although I believed tubal pregnancy had occurred and rupture had taken place. It was not easy, however, to obtain consent to operate. I have had two cases within two months. One of these patients was brought into my hospital; she was watched constantly for a week or ten days after the first rather obscure symptoms. She had a hemorrhage again, and was operated on within fifteen minutes. I removed the blood and tube with a fetus in the end of it. The other patient would not consent to operation, although the symptoms pointed very strongly to rupture of a tubal pregnancy, yet she had no further symptoms and recovered entirely.

There are certainly a great many cases of tubal pregnancy which take care of themselves, as the many cases of spontaneous recovery, always used to, apparently, by the formation of hematocele and without any further trouble. The fetus is expelled from the tube and dies. Whether it should be laid down as a rule for the general practitioner always to operate immediately or not, I will not discuss.

In regard to cases in which there is a severe hemorrhage, I think this is a favorable opportunity to call your attention to something which has been recently worked out by Professor Leary, of Boston, and I have used it in one case successfully. There can be obtained from the heart of a rabbit through a hypodermic needle, without much inconvenience, a couple of ounces of blood from which a serum can readily be made, and which is more efficacious when in-

jected hypodermically than any salt solution, in that it has a very advantageous effect not only in cases of active hemorrhage of this description, but after hemorrhage of various descriptions. An absolutely fresh serum can be obtained in that way, which is of very great importance in these cases of profound collapse from loss of blood. Professor Leary will bring this work out next week in a report to the Massachusetts Medical Society at its annual meeting.

Dr. Hunter Robb.—Mr. Chairman and Members of the Society: It would be impossible in a few minutes to discuss all of the points that have been brought out in this symposium, but I would like to present a short summary of my views.

1. More conservatism in the treatment of ectopic pregnancy is called for in the majority of cases.

2. When the diagnosis of ectopic pregnancy is certain, operative measures are indicated; but in most cases the danger is not sufficiently imminent to warrant immediate interference unless the condition of the patient is otherwise satisfactory.

3. Many women not only survive the effects of a tubal abortion or rupture, but also recover even without an operation.

4. Not more than 5 per cent. of the victims of ectopic pregnancy die at the time of rupture, whereas after the immediate operation, in cases of ectopic gestation in 1176 cases in twenty-five clinics, the mortality was 8 per cent.

5. When a patient is seen in a state of collapse, as the result of a ruptured ectopic sac, she should not be operated upon until the condition of shock has been tided over.

6. These patients, when they die, usually succumb, not from loss of blood, but mainly from shock. Why, then, should we superadd to the original shock the additional shock of a major operation, with all the exhausting preliminary procedure?

7. In support of the view that these patients die from shock and not from loss of blood, we have clinical observations of good authorities, and also experiments on animals, the first showing that patients whose abdomens were filled with bloody fluid survived; and the second proving that dogs when exposed to dangers from hemorrhage (sufficiently

severe to more than equalize the factor of resistance) do not succumb.

8. In most of these cases, when we operate to ligate a bleeding vessel, no bleeding vessel is found. In some cases the bleeding is undoubtedly started again by the manipulations of the operator.

9. What frequently appears to be a continuing hemorrhage may be produced by a welling up of the blood that was poured out when the sac finally escaped through the fimbriated end of the tube.

10. Some of the reasons for believing that the hemorrhage is not so great as has been generally supposed at the time of rupture are as follows:

(*a*) The great majority of ectopic sacs rupture between the first and third week of gestation.

(*b*) The point at which the impregnation takes place is a small area formed by a diverticulum in the tube, and the chorionic villi have only a feeble attachment.

(*c*) Seventy-five to 78 per cent. of the ruptures occur through the fimbriated end of the tube and are tubal abortions, and are not more dangerous so far as hemorrhage is concerned than those occurring through the cervix.

(*d*) The next most frequent place of rupture is the isthmic portion of the tube, which is also free from any large blood-vessels.

(*e*) The point of rupture in the gestation sac practically never involves the ovarian or uterine artery.

(*f*) As a result of the inflammation which precedes the ectopic gestation, there is a relative increase of the connective tissue in the tube, and owing to the contraction of the connective tissue the vascularity of the tube is limited.

(*g*) The placenta is generally attached to the posterior wall of the tube, and as the rupture is generally through the anterior or lateral wall of the tube the placenta is not lacerated, but retains its firm attachment to the wall of the tube and is subjected to pressure.

11. Physiologists teach that a woman weighing 130 pounds must probably lose four pounds of blood before succumbing to the effects of the hemorrhage per se. So large an amount of blood is rarely found in the abdominal cavity—the bloody fluid is a mixture of blood and a serous exudate.

12. The sudden removal of a large quantity of recently accumulated fluid in the abdomen, before the other vessels have had time to adapt themselves to the altered mechanical conditions, is dangerous and may be followed by fatal syncope.

13. Patients in whose cases the bleeding would be sufficient to cause death are rarely seen in time to be saved by an operation for ligating the bleeding vessel.

14. Our best operators give a percentage of 40 to 50 per cent. as their death rate after immediate operations during shock. The deferred operation has given better results in the hands of equally good operators.

15. So long as there is a reasonable evidence that immediate operation may be the wrong procedure, it is our duty to hold our hand and leave something to Nature. The medical profession has to a large extent given up the use of dangerous drugs unless the indications for their use are clear. Should not operators have the same consideration for the lives of their patients?

Dr. J. Wesley Bovée.—I think we all concede that women rarely ever lose so much blood in rupture of ectopic pregnancy that at least 5 per cent. of them die or would die as the result of hemorrhage. There can be no doubt as to the advisability of operation in certain cases of ectopic pregnancy, particularly those in whom rupture has taken place. In this 5 per cent. there is debatable ground as to whether operation should be done immediately during shock, or deferred until shock has disappeared. Perhaps in a large percentage such doubt exists, because those cases in which rupture has taken place and hemorrhage is profuse will undoubtedly die if not operated on. If they do not die from the first hemorrhage they are likely to die from a subsequent hemorrhage. These cases are reported every day. I will refer to one I saw a short time ago in which the patient was treated in a tentative manner. In this instance there was a total cessation of symptoms for seven months. Within ten weeks there was a recrudescence which rendered an operation highly desirable. The patient was operated on, and a fetus with membranes was removed.

In another case, a report of which was published by Fairburg, the patient presented all the indications of tubal

abortion with hematocele. There was an interval during which the urgent symptoms subsided, and after several weeks there was a return of the symptoms which necessitated operation. Operation showed a continued growth without the formation of hematocele.

There are several cases mentioned in a report made by Schauer in the *Journal of Gynecology of the British Empire*, which bear on the point as to whether operation should be done early or late, also taking up the method of attack. I believe myself, from what experience I have had, modified to some extent by my reading, that in every case of ectopic pregnancy an early operation is indicated, and no case is safe without it.

As to some of the points mentioned by Dr. Robb, such as the removal of large quantities of fluid before the vessels have become accustomed to it, I do not believe it has a strong basis. I think we find it in other matters such as the rapid development of ascites in which we remove considerable quantities without danger to the patient. In other conditions like gunshot injuries, traumatisms of various sorts, in which we have intraperitoneal hemorrhage, the accumulated blood can be removed without any special symptoms following it.

As to the route, I believe we should always adopt the abdominal in these cases. If the case is urgent of course the surgical work should be correspondingly rapidly done. There is no indication in my mind for vaginal section in ectopic pregnancy. I have several times done vaginal section when I had not made the diagnosis of ectopic pregnancy. But wholly from the danger of infection which we find attends the vaginal route, I think it is far more dangerous to make section in that direction.

Another point which is apparently in favor of early operation rather than deferred operation, is the danger of infection with hematocele from various sources, which, of course, is greater in the cases that are delayed than in those that are operated on promptly.

I agree with Dr. Montgomery. Someone has suggested the danger of stimulation while the hemorrhage is in progress or even before we have secured the bleeding vessel.

As regards the few ounces of serum which Dr. Cushing

told us about getting from a rabbit's heart and injecting it into the tissues, it seems to me that is a small quantity as compared with what we can do with salt solution.

Dr. Andrew F. Currier.—The arguments pro and con on this subject have been pretty nearly exhausted, so that anything one can say will amount to little more than an indorsement of one side or the other. As a general thing, as a person gets older he becomes more conservative in regard to surgical procedures, yet, as there is scarcely a rule which has not its exceptions, it may be that this is one of the exceptions; at any rate, as I become older my views in regard to this condition and its treatment become more radical and positive. Certainly, those of us who have seen cases in which procrastination has been practised, and in which palliative attempts at operation have been made, for instance, in attempts to remove the accumulation of blood through the vagina, have received such definite impressions in regard to the proper procedure that there is very little room for doubt or for further argument.

I believe with those who have spoken on this subject that all these cases are surgical, and just as we would stop bleeding in any portion of the body, after making the diagnosis that bleeding exists, it is equally proper that we should stop a concealed bleeding of this character. It is going to take a very acute mind to say that hemorrhage has actually ceased, and if we are satisfied there has been bleeding I cannot see what object there can be in delaying, except in those cases which have been referred to in which the symptoms are mild, and in which it is possible to bring the patient under more favorable surroundings before performing the operation. But if hemorrhage has occurred we ought to determine with positiveness whether the case is one which at the earliest possible moment should be treated in a surgical manner. As others have already stated, how do we know, if we defer operation, when unfavorable complications may arise? Who can tell us that bleeding may not recur? Who can tell us that sepsis and peritonitis may not take place? It is our duty, therefore, to lay down the broad rule, that once we have made a diagnosis of intra-abdominal hemorrhage, even though we may not be sure whether it is from the tube or not, to treat the case surgically and at the earliest possible moment open the abdomen.

Dr. Hugo Ehrenfest.—Statistics have been cited to indorse either deferred or immediate operation in cases of ruptured ectopic pregnancy, but those statistics include only the patients who have reached the hospital or the operating table respectively. They leave out of consideration entirely those cases in which the diagnosis is made in the coroner's office or the patients are buried with a diagnosis of peritonitis. These, however, are to a large extent cases in which the operation has been deferred and the patients have been treated conservatively. I am inclined to believe that if these cases were properly considered in the statistics, they would change them decidedly in favor of immediate operation.

Dr. Bovée has mentioned the danger of infection if hematocele is permitted to proceed. His remarks have reminded me of an interesting observation which is very much to the point. I operated on a woman a few weeks ago who had infected a retro-uterine hematocele by an attempt to perform a criminal abortion on herself. She came under my care with the typical picture of a septic abortion, a mass being felt to right of uterus. From the history and peculiar findings a diagnosis of infected hematocele was made and confirmed by operation. The hematocele was probably two or three months old.

Dr. J. Pfannenstiel.—I think we all agree that the surgical law must be followed in considering these cases of ectopic pregnancy. However, with increased experience we will all have cases in which no method of treatment seems to help. Those are the instances in which the openings are very small like the head of a pin or a needle, and yet the hemorrhage is quite profuse, and I would not like to defer operation in such a case. There are very rare cases in which the hemorrhage is so profuse that we have to regret not having operated promptly. I think we should operate on such cases as early as possible, but without precipitation. I had one case not long since which illustrates this in a very striking way. The woman was prepared for operation. There was the formation of hematocele. Several spectators saw the case, and we made a diagnosis of ectopic pregnancy without bleeding. She was prepared for operation a few minutes before she was brought to the operating table. I

opened the abdomen very quickly, and in a few minutes the operation was done, but death followed in spite of all the measures instituted by us to guard against it. I think those of us who have had a great experience will always meet with such cases. But such rare cases ought not to be considered as bases for the formulation of rules. When we have only between 1 and 2 per cent. mortality from timely operations on these cases, I think we should be prepared to operate at the earliest possible moment, but without precipitation.

Dr. Brooks H. Wells.—In 1887 it was my privilege to be present as a visitor at the meeting of the American Gynecological Society, and at that session Dr. Janvrin very strongly recommended abdominal section in the treatment of cases of ectopic pregnancy. Before that time there had been very few abdominal sections made, and there was great opposition to Dr. Janvrin's advice. Shortly after that it was my melancholy duty as an assistant to sit at the bedside of a young woman and watch her die as a result of internal hemorrhage from a ruptured ectopic pregnancy, and a few months later that experience was repeated. The diagnosis in both instances was confirmed by autopsy. The painful impression left by those cases has been so strong that ever since I have not felt myself justified in refusing to operate on a case of ectopic pregnancy. Out of a large number of cases I can recall eight seen during the tragic condition. In some there was a little waiting for a possible improvement of the patient, but I feel that in all cases of ectopic pregnancy, in the 95 per cent. that may get well without operation, and in the 5 per cent. that would die, the best results are obtained by operation done just as soon as the diagnosis can be made. Since the paper of our President, Dr. Baldy, on the "Diagnosis of Unruptured Ectopic Pregnancy," which appeared in 1890, and with the added knowledge we now have, there is little excuse for any of us overlooking the diagnosis. In all of these cases the individuals who make the quickest and smoothest convalescences, and who have the fewest symptoms of trouble afterward, are the ones who are operated on quickly, and the morbidity in cases that are operated on quickly is much less than in those that have been put "in cold storage" for sometimes days and weeks. I can conceive

that it may happen to me to have a patient in such a condition that I would not dare operate for fear the shock of the operation would kill her; but if the operation is done quickly, and the operator is skilful, in my own experience patients do not die from shock of the operation, but from loss of blood, neglect, and delay, so that I would advocate, excepting in the rarest instances, that operation be done as soon as possible, provided always that a competent operator can be obtained.

Dr. Joseph Taber Johnson.—In listening to this discussion one is struck with the differences of opinion that have been expressed, and with the difficulty of attempting to decide why so many doctors disagree. There is no doubt but that they honestly disagree, but in going over the matter, as I understand it, and as I have been accustomed to think of it, and as I have read of it during the years of my professional life as they have passed along, I thought this was one of the settled questions, and it appears to me the discussion of it in such a positive way, as has been done today, is likely from my standpoint to do more harm than good.

I do not think we can rely on the dogmatic statements made by my friend, Dr. Robb, regarding operations on dogs, because we are exceedingly thankful that a woman is not a dog. We cannot rely entirely upon these examples of operations upon dogs any more than we can rely upon the library statistics that are given by our pediatric brethren for the modification of infant's food by their laboratory experiments in test tubes. We thank the good Lord again that the inside of a child is not a test tube any more than the inside of a dog is like the inside of a woman.

From my standpoint I do not see how we can accept the statistics and statements of Dr. Robb in regard to the diagnosis of his class of cases, when it is universally admitted that the diagnosis of unruptured and very frequently of ruptured tubal pregnancy is so very, very difficult from the symptoms presented.

Dr. Gordon has quoted Lawson Tait as saying that it was hardly possible for any living man to diagnosticate unruptured tubal pregnancy. I heard him make the same statement, but I think we all agree that in cases of unruptured tubal pregnancy we should proceed as radically as for the treat-

ment of placenta previa or for puerperal threatened convulsions, and the putting off of these cases, particularly when rupture has already been diagnosticated with the belief that no more hemorrhage will occur, is, from my standpoint, an exceedingly dangerous practice and likely to result in more harm than good. I do not see how gentlemen who occupy Dr. Robb's side in this discussion can be at all sure when they say they have saved patients by the waiting method in cases of ruptured tubal pregnancy—that they had cases of actual ruptured tubal pregnancy when they did not open the abdomen to find out. I believe a great many women would rather perish in the attempt to get well under these formidable circumstances than have us sit idly by and do nothing as we did years ago in cases of gunshot injuries of the abdomen, put on a flaxseed meal poultice, give them opium, and slide them out of the world as gently as possible. It seems to me it is a backward step for us to sit idly by with the idea that these patients are not going to bleed any more. No man can say that bleeding is over. If bleeding were over it would be all right not to do anything. If we are sure that rupture has taken place in the folds of the broad ligament and is going to be confined there, and the hemorrhage controlled by compression, it would be well to wait. We cannot tell definitely whether hemorrhage has ceased in these cases any more than we can tell when the danger point in appendicitis has passed. You may decide in a case of ectopic pregnancy that the hemorrhage is over and the woman is safe, but before you get home she may bleed to death with another hemorrhage. All things considered, provided you have a skilful operator and good surroundings, where emergency surgery is necessary, the sooner a ruptured tube is taken out the better. Suppose it forms hematocele. Hematocele is not a nice thing for a woman to have in her abdomen anyhow. Large hematocele clots make pressure and may stop hemorrhage. But these hematoceles become infected, as Dr. Bovée has pointed out. I have operated on a number of such cases in which there was a conglomeration of pus and serous fluid, and by removing it through the abdomen, just enough to relieve pressure, the patients have gone on and have undergone a better operation later.

Dr. Wm. Gardner.—I wish to thank you for the courtesy of being asked to participate in this discussion, but so much

has been said, and so well said, I do not think I can add anything of interest.

Dr. Gordon has alluded to the meeting of the British Medical Association held in 1886. I was present at that meeting, and at that time all of us had not given up entirely the treatment of these cases, when we had made the diagnosis, by the injection of morphine into the sac, and by treating them by electricity. I treated such a case, as I supposed successfully, by electricity at about that time, but of course the question of diagnosis came up. I am sorry that the name of Lawson Tait has not been given more consideration in connection with this subject, because, after all, we are indebted to him for the pioncer work in the modern treatment of this condition. I was then not at all certain that a correct diagnosis had been made in the case I treated, but at all events the patient got comparatively well. This was in the year 1884 or 1885. Some five years ago this same woman had to submit to an operation for the removal of a small lithopedion, proving that the diagnosis of ectopic pregnancy was correct, but not at all settling the question of rupture.

Today I am inclined to agree with those who are cautious in the treatment of debatable cases such as we have under discussion. Of course, we all admit that operation must be done in the majority of cases. The question is, Shall we wait or not in face of the very grave problem presented to us in these cases? Shall we wait or operate immediately? I think my friend, Professor Pfannenstiel, sounded the keynote when he said operate, but without precipitation. The decision of this question will depend to some extent upon the individual surgeon. Some surgeons are more aggressive than others; they are more actuated by the apparent gravity of a case, and will operate immediately, sometimes to the increased danger of the patient. I confess to be on the side of those who would wait in the case of a very dangerous situation, and would watch the case most carefully before deciding to operate.

Dr. A. Lapthorn Smith.—When I received a copy of this program it was somewhat of a shock to me to see that the question was even to be discussed as to whether we should operate or not in cases of ectopic pregnancy. There is no

doubt whatever in my mind but that these patients should be operated on as soon as suspected, because a woman may bleed to death in an hour or two after rupture takes place. Knowing how dangerous the condition is, and that at any moment rupture may take place, operation should be undertaken at once, otherwise it may be too late to operate. In most of my cases the abdomen was full of liquid and clotted blood, and as it is not an easy matter to remove these clots I have sometimes left some of them in to save time. We should remember that shock is hemorrhage, and if a woman is in shock it is because her heart is not supplied with enough blood through the coronary arteries; as soon as the heart pumps stronger, in other words, when she comes out of shock, there will be a fresh hemorrhage; so that it is a good thing to operate before the heart gets strong again. I consider this *the* time to operate while the heart is quiet for a few minutes. This is the time to open the abdomen and tie the bleeding vessel or vessels, fill her up with salt solution, and in a few hours she will have a good pulse. I have had 2 deaths out of 42 cases of ectopic pregnancy. In one of these I waited because the patient was considered to be in a bad condition. I waited until full time, when I opened the abdomen and removed a living child. The child died that afternoon, and the mother died seven days afterward. In the other case death occurred nine days after operation from la grippe, or what was then an epidemic in the hospital.

I look upon tubal pregnancy as a malignant disease. It is not a medical but a surgical disease, which if left alone has nothing but danger ahead of it; and if we would do our duty to the woman, we should remove the tube promptly.

Dr. Egbert H. Grandin.—I have listened to what my friends and colleagues have said with a good deal of interest about waiting in these cases until the heart gets stronger. Our aim should be to avoid funerals. Of course there are some women you cannot kill, just as there are some dogs you cannot kill. I know there are some women whom it is hard to kill, because in my clinical work among the Italians I take liberties with them that no other class would stand. I do not believe in pocket-knife operations. I simply plead for accurate diagnoses and early operation in

these cases. I am opposed to waiting for hours on account of shock. We are not adding *shock* to *shock* by operating, but we are operating to prevent *hemorrhage* from being superadded to *hemorrhage*. Let us forget this word *shock* and remember the word *hemorrhage*. This may occur again at any time!

Dr. Hiram N. Vineberg.—In reference to the distended abdomen from ruptured ectopic pregnancy, my experience has been that the patient improves as soon as the abdomen is opened and the pressure is removed. As to the cases that may be left to Nature, I do not think they are the ones in which considerable hemorrhage takes place, and in which there is hematocele. It is that class of cases in which at an early stage there is an effusion of blood into the capsule arresting further progress of growth of the ovum, and when we operate we find a merely small clot adherent to the inner wall of the tubes. If we can recognize these cases they would be the cases we could safely leave to Nature.

Statistics are misleading, and with all due respect to the German clinics their mortality at the present time is exceedingly high in these cases. It ranges from 10 to 15 and 20 per cent. Zuntz (*Archiv. f. Gyn.*, Band lxxiii, p. 22), 54 cases with 11 deaths (20.3 per cent.); H. Futh (*Zentlbl. f. Gyn.*, 1905), 21 cases with 2 deaths (10 per cent.). This high mortality I attribute to their custom of keeping their cases under observation for a long time before operating.

It is my custom when a diagnosis of ectopic pregnancy is made, to have the patient operated on within a day or so. The cataclysmic cases are operated on immediately, and so long as our results are what they are, namely, practically 100 per cent. of recoveries, by the plan I have outlined to you, I do not feel like changing my method.

Dr. F. F. Simpson.—I think we should make a distinction between the different operators. Unquestionably a man of wide experience and a skilful operator may operate on cases of extra-uterine pregnancy with a low mortality; but if the teaching goes out that operation is immediately necessary in order to save life, operations will not be limited to experts alone. Many practitioners will feel that these cases are just as important as cases of strangulated hernia and call for immediate operation, and they will feel that they ought

to operate, and as a result of their operations, many patients will die. It is questionable in my mind, admitting that 95 per cent. of the cases will not die immediately from hemorrhage, whether the inexperienced operator should be taught to jeopardize the lives of the 95 per cent. in order to save the lives of the 5 per cent. The coroner's cases should not be considered. The mere fact that they have gone to the coroner indicates they were not recognized, and no definite plan of treatment was instituted at any time during the course of their illness.

As to the necessity for operating I feel that almost every case of ectopic pregnancy at some time in its existence requires operation. In something more than one hundred sections referred to, without any mortality from hemorrhage, more than one hundred in number were operated on, and I quite agree with Dr. Johnson that it is not wise to leave such debris in the abdominal cavity indefinitely.

Dr. Krug (closing).—I have nothing to detract nor anything in particular to add to my paper as read. Those who have not heard it will have a chance to read it. All I can say is this, that the best proof of the pudding is in the eating. My results in former years were in a measure due to the fact that I strictly adhered to the iron-bound rule of operating in all cases at once. The results were good, but not good enough. Since I individualize and in some cases temporize a little, my results have been better. Of nearly one hundred cases since operated on in my service in the Mount Sinai Hospital, only two died: *none* of hemorrhage or shock, and that is as good a percentage as we can expect in an unselected series of cases at the present day.

PERNICIOUS ANEMIA AND PREGNANCY

By Palmer Findley, M.D.,
Omaha, Nebraska.

But one paper has been presented to this Society on the subject of "Pernicious Anemia and Pregnancy." In 1891 Dr. Edward P. Davis presented "A Contribution to the Study of Puerperal Pernicious Anemia." In this paper Americans were listed among the early writers on the subject. Special credit is given Channing, of Massachusetts, for his report of 17 cases, published in the *New England Quarterly Journal of Medicine and Surgery*, October, 1842, No. 2. All of Channing's cases died. In none of them was the anemia in evidence until days or weeks following delivery.

Davis reported a case which the author states was delivered of a living child that showed no evidence of anemia. The mother passed from a state of threatened pernicious anemia to that of chlorosis under the influence of arsenic, oxygen, and food.

In 1854 Lebert reported 3 cases of pernicious anemia complicating pregnancy, calling them cases of puerperal chlorosis.

Griesinger, director of the medical clinic of Zurich, reported 4 cases in 1860 and called them "Kachektischer Anæmia." Two of the 4 cases died in the puerperium. No blood examinations were made, hence the anemia was not certainly pernicious in type.

The most noteworthy contribution on the subject is that of Gusserow, who, in 1871, reported 5 cases of high grade anemia complicating pregnancy. He regarded all as pernicious in type. These cases were found in Gusserow's clinic from 1868 to 1870. All died. Their ages ranged from twenty-four to thirty-six years. The previous health of all was good. Four were multiparæ. In all the anemia was ushered in during gestation, and all aborted in the eighth month of pregnancy. Death followed speedily upon the emptying of the uterus, one before the delivery of the placenta.

The postmortem findings were uniform. There was a high-grade anemia of all tissues and organs, fatty degeneration of the viscera, serous effusion in serous cavities. The spleen and lymph nodes were not enlarged, and in none were the white blood cells increased in number.

Jaworsky reported a single case of a woman, aged forty-five years, XII-para, previous health good. From the onset of her thirteenth pregnancy she complained of increasing weakness. At the end of the second month she was no longer able to walk. In the thirty-sixth week of gestation a miscarriage occurred, and the child died shortly after delivery. Three days later the mother died.

Sanitor reported a case in the seventh month of gestation that pursued an unusually rapid course. Two weeks before her admission to the clinic she believed herself perfectly sound in health. At the time of admission to the clinic the red cells were reduced to one-sixth their normal number.

I. Clivio (Parma) reported 5 cases of pernicious anemia complicating pregnancy (*Am. di ost. e gin.*, August, 1901). Three of the pregnancies terminated spontaneously; two were aborted by bougies. One patient died shortly after aborting; the remaining four recovered. The report of blood examinations in these cases is wanting, hence it is not known with certainty that the anemia was of the pernicious type.

That pregnancy and the puerperium favor the development of pernicious anemia is recognized by authors in general.

Planchard says that, excluding those cases of pernicious anemia arising in the puerperal woman, the disease is more common in men.

There is abundant evidence to substantiate the statement that women are more liable to pernicious anemia during pregnancy and in the puerperium than at other times.

Ahlfeld wrote in his *Lehrbuch der Geburtshülfe*, 1894, that he had never as yet seen a case of pernicious anemia complicating pregnancy.

Wagner finds no place for pernicious anemia as a disease peculiar to pregnancy.

In the obstetric clinic of Zurich for 1877 to 1898 there were 8515 pregnancies, and of this number 19 had pernicious anemia.

Following are the statistics of Myer-Ruegg, of Zurich: 1872 to 1882—2616 pregnancies—15 cases (0.573 per cent.). 1883 to 1900—11,784 pregnancies—7 cases (0.573 per cent.).

Eichhorst found in 67 cases of secondary progressive anemia which were examined postmortem that 29 had developed subsequent to childbirth.

It is difficult to account for the apparent effect of pregnancy on the development of pernicious anemia. No satisfactory explanation has yet been made.

Klebs believes chronic puerperal infections may be mistaken for pernicious anemia. It is rare that postpartum hemorrhages precede the development of a progressive anemia. Prolonged lactation may and probably does have some influence.

Multipara are more liable than primipara, and particularly so when one pregnancy has followed quickly upon another. Such conditions as overwork and malnutrition predispose to the disease, though it is observed in many of the reported

cases that the mother was apparently in perfect health until in the second half of the period of gestation, when a rapidly progressing anemia set in, the pregnancy interrupted prior to full term, and death quickly followed.

The clinical picture as seen in the reports of cases is rather uniform.

In a large per cent. of the reported cases the anemia has first made its appearance in the second semester, and of this number the majority have not been known to have pernicious anemia until near the end of pregnancy or in the puerperium. The onset is usually sharp, beginning with digestive disturbances or loss of blood. As a rule, it has not been possible to fix the time of onset of the anemia. As far back as the anemia can be traced the patient complains of constipation or diarrhea, vertigo, disturbed vision, anorexia, general lassitude, palpitation of heart, and ringing in the ears.

We find the mucosæ pale, the skin pale and sallow. At the height of the disease comes apathy, frequently tabetic symptoms with ataxia in the legs, the reflexes lost, the pulse almost always small and running from 90 to 120.

Examination of the blood shows red cells lessened, even to 250,000 or less. There are numerous nucleated reds, and the cells are distorted in shape. Macrocytes, microcytes, and poikilocytes are present. There is no diminution of hemoglobin. The white cells are not increased in number. The eosinophiles and neutrophiles are lessened, but the lymphocytes are not decreased in number.

The fibrin and blood plaques are diminished.

The postmortem findings are as follows:

Anemia of all organs, fatty degeneration of heart muscle, kidney, liver, stomach, intestine, and intima of bloodvessels. Small hemorrhages in kidney, pancreas, brain, liver, pleura, pericardium, and spinal cord. Lymph nodes not enlarged; spleen often somewhat enlarged. Bone marrow of lemon-yellow color.

According to Planchard, an absolute diagnosis is based upon the following data:

1. Exclusion of other possible causes.
2. Blood examination.
3. Fatal termination.
4. Postmortem findings.

It is not possible to arrive at a diagnosis in the early stages. Later the blood findings become characteristic.

As to prognosis, all fully established cases have terminated fatally.

That there is a higher mortality in pernicious anemia of females than in males is suggested by the statistics taken in Zurich from 1877 to 1898, during which time 79,258 men and 69,012 women died, and of this number 200 (0.25 per cent.) men died of pernicious anemia and 396 (0.57 per cent.) women. In the medical clinic of Zurich from 1870 to 1878, there were 6337 males and 3768 females in the clinic, and of this number 33 were men and 60 were women.

Occasional periods of improvement are sometimes noted. In the majority of cases pregnancy is prematurely interrupted. Labor usually progresses rapidly with little pain and little loss of blood. As a rule, the placenta follows quickly. The patient weakens, the pulse becomes small and rapid, and death often follows within a few hours. Occasionally life is prolonged for days, weeks, and possibly several months.

In the majority of cases the child dies in utero shortly before birth. If it lives, it shows no signs of the mother's disease.

M. Gräfe advises induction of labor. In the early stage it is not possible to say with certainty that the anemia is pernicious in type, hence at such time the induction of abortion is not justified.

It is worthy of note that Osler takes a more hopeful view of the outcome of pernicious anemia of pregnancy and the puerperium, and advises arsenic in large doses.

The following report is given me by Dr. A. D. Dunn, of Omaha, who was in consultation with me:

REPORT OF CASE.

The patient was referred by Dr. Jones, of Griswold, Iowa, as a pregnancy combined with suspected pernicious anemia. Her age was forty-two years. She had been married ten years and had borne six children. No abortions. No history of excessive loss of blood or infection as the result of previous pregnancies. At the time of her admission to the hospital, May 14, 1907, she was in the thirtieth week of gestation. Early in pregnancy she began to feel weak. She rapidly grew weaker and paler as the pregnancy progressed, but pursued her housework until six weeks before her admission to the hospital. Her appetite was fair and there were no unusual subjective symptoms other than that of weakness. Nothing in the family history having a possible bearing upon the case. Because of the critical condition of the patient only this meagre history was obtainable.

Examination by Dr. Dunn, of Omaha, was as follows:

General Appearance. Patient is a well-developed woman, apparently thirty-five to forty years of age. There appears to be no emaciation. The skin is of a faded, lemon-yellow hue. There are no petechiæ or subcutaneous hemorrhages. Patient is markedly dyspneic, orthopneic, and but little cyanotic. Pulse rapid, 110. Blood pressure, 143 r.r. (5 cm. band). She wanders and is slightly delirious.

The heart is little enlarged, especially to the right of the sternum. A systolic murmur is to be heard all over the precordium; it is soft and blowing in character, and loudest in the mitral area. There are no accentuations of any of the sounds, except for some moist rales at the bases of the lungs, there are no pulmonary findings.

Abdomen. The liver is somewhat enlarged and tender, especially in the epigastrium. On deep inspiration the edge can be felt two to three fingers' depth below the costal arch

in the nipple line; spleen not palpable. There are the findings of between a seven and an eight months' pregnancy. There are no fetal heart sounds. There is slight retro-malleolar and tibial edema. Tenderness over sternum and tibia.

She was admitted to the hospital May 14, 1907, at 6 P.M. No fetal heart sounds were heard and no fetal movements were detected. At 7 A.M. on the following day she was delivered spontaneously and with no pain. While not aware of the birth, she told the nurse that she had soiled the bed, and on inspection the nurse found the dead baby and placenta lying upon the bed. There was very little blood lost. The blood pressure an hour after delivery dropped from 143 to 88, when she became comatose and died at 8.30 A.M.

The postmortem findings were a large amount of lemon-colored fat in the abdominal wall, the skeletal muscles showed fatty changes, as did the heart, liver, kidneys, and uterus. There was atrophy of the stomach and intestinal mucosa and the characteristic bone findings.

Blood Examination of Mother.

Reds	672,000
Hemoglobin, 16 Dare 20 Talquist Index	1.2
Differential nucleated cells:	
Polymorphonuclear neutrophiles	60
Myelocytes	11
Eosinophiles	0
Lymphocytes	15
Large mononuclears	1
Normoblasts	2
Megaloblasts	7
Mastzellen	4

Karyokinetic figures present in reds in considerable numbers.

Polychromatosis and poikilocytosis marked.

Bone marrow shows megaloblastic hematogenesis.

Babe. A count was made of some fluid blood found in the right ventricle of the infant about three hours after birth:

Reds, 3,720,000.

Hemoglobin, 1.08 Dare.

Polychromatosis, plus.

Poikilocytosis, plus. Nucleated reds in large numbers. An occasional megaloblast is to be seen.

There were no characteristic findings of pernicious anemia in the babe.

RESUME. 1. Pregnancy and the puerperium exercise a favorable influence upon the development of pernicious anemia.

2. Women are more liable to pernicious anemia during pregnancy and the puerperium than at other times.

3. There is no satisfactory explanation for the effect of pregnancy upon the development of pernicious anemia. Frequent childbearing, prolonged lactation, overwork, and malnutrition are predisposing factors.

4. There is a remarkable uniformity in the clinical phenomena and postmortem findings.

5. The onset of anemia is usually in the latter half of pregnancy.

6. The diagnosis is not possible at the onset, but is later determined by exclusion of other possible forms of anemia, by blood examination, fatal termination, and finally by postmortem examination.

7. The child usually dies in utero or shortly after birth, and has never been observed to show pernicious anemia.

8. Spontaneous interruption of pregnancy is the rule.

9. In all well-established cases the disease has proved fatal.

DISCUSSION.

Dr. Richard C. Norris.—This affection is very rare. In my experience with 3000 deliveries at the Preston Retreat, I have seen but one case of pernicious anemia. The blood of this woman, who entered the hospital a few days before delivery, showed 12 per cent. hemoglobin. She fell into spontaneous labor, and the striking characteristic of her labor was a failure of the blood to clot. She had no hemorrhage as in the case just reported by Dr. Findley, but there was considerable oozing from the uterine cavity which persisted, and despite the intra-uterine pack the use of adrenalin and all available methods for the control of the hemorrhage she finally died from a persistent oozing from the uterine cavity. The nurse reported that the patient had incontinence of urine; the serum that persistently oozed from her uterus was slightly tinged with blood. She lived about forty-eight hours and died from anemia, and at autopsy the findings were essentially those mentioned in the paper. This is the only case of this uncommon disease I have had in my work. The origin of this disease in pregnancy is obscure. This patient was only observed for a few days. As I have previously said, the principal characteristic was the inability on the part of her impoverished blood to form clots in the uterine sinuses, and thus to save her from bleeding to death. She was given salt solution repeatedly, but without avail.

SUGGESTIONS IN TEACHING GYNECOLOGY, WITH DEMONSTRATION OF SPECIAL (MECHANICAL) CHARTS AS AN AID IN THIS WORK.

By John A. Sampson, M.D.,
Albany.

From the standpoint of the development of the student's knowledge of medicine in general, three phases in the study of any of its clinical branches naturally suggest themselves:

1. The study of each disease as a "science," *i. e.*, its etiology, the changes in anatomy occurring in its different stages as we see them in the pathological laboratory, and, of the greatest importance, the study of the explanation of its symptomatology.

2. The rearrangement of the knowledge gained from the study of disease as a science in order that this knowledge may be applied to its greatest advantage in clinical work, *i. e.*, the classification of the symptoms caused by the diseases studied, and the study of the various causes of each symptom from the standpoint of that symptom and also with a view to ascertaining how its causes may be differentiated. This phase may be called "the study of the significance of the various symptoms."

3. The study of the art or technique of the clinical branch of medicine under consideration which requires actual contact with the patient.

FIRST PHASE, THE STUDY OF ANY DISEASES AS A "SCIENCE."

In order that the student may clearly understand the changes caused by the disease in any part of the body, its effect on the individual as a whole, and the explanation of its symptomatology, knowledge of the following is necessary:

1. The normal anatomy of the organs and parts which may be altered by the disease, *i. e.*, their development, structure, form, size, anatomical relations, mobility, *and the manifestations of these.*

2. The normal physiology of the organs and parts, how their functions are accomplished, and especially their sensibility, because pain, one of the most important subjective symptoms, can arise only from sensitive structures.

3. The changes which the pathological process under consideration (whether injury, infection, or newgrowth) causes in the tissues of the body.

In addition, the student must realize that the symptoms of any abnormal condition are only manifestations of normal anatomy and normal physiology as altered by that condition; those which the patient perceives are known as subjective symptoms, and those which the physician detects are known as objective symptoms. Thus equipped, the student is ready to study the diseases intelligently, and, I believe, only when thus equipped.

The etiology and course of each disease may be demonstrated by means of sketches on the blackboard, charts, modelling clay, casts, or actual specimens, using whichever of these methods is best adapted to the particular subject under consideration. In this way the various conditions arising during the course of any disease or resulting from it may be developed before the class, always beginning with the normal and from it developing the abnormal.

The conditions caused by each disease may thus be presented to the class as illustrated problems which they should attempt to solve from their knowledge of normal anatomy, normal physiology, the manifestations of these, and the knowledge of the changes caused by the pathological process present. In order to facilitate the solution of these problems, such questions as the following are asked (calling the members of the class up in turn): (1) Describe the abnormal condition present. How did it arise? (2) With what functions may it interfere? (3) What manifestations of altered anatomy and altered physiology may be noticed by the patient, *i.e.*, what are the subjective symptoms? (4) What manifestations of altered anatomy and altered physiology may be detected by the physician, *i. e.*, what are the objective symptoms. (5) What conditions, already studied, may simulate the present one? As this phase of the subject is preparatory to future clinical work, methods of diagnosis, treatment, and prophylaxis may be briefly discussed.

The students are thus taught to observe, use what knowledge they already have, and work out, with the aid of the teacher, the various problems presented, instead of memorizing data obtained from didactic lectures or text-books. The students' answers, corrected, when necessary, and supplemented by information which they cannot be expected to reason out, should constitute our present knowledge of the disease under discussion.

Let us consider the subject of uterine myomata from the standpoint of its study as a "science" and particularly with a view to the demonstration of mechanical charts as an aid in illustrating the various problems occurring in its different phases.

The development of myomata should be discussed first. Their possible situations in the uterus can be well indicated by drawings on a blackboard or by charts. The various degenerative changes are best known by actual specimens.

The frequency and significance of these changes should be emphasized.

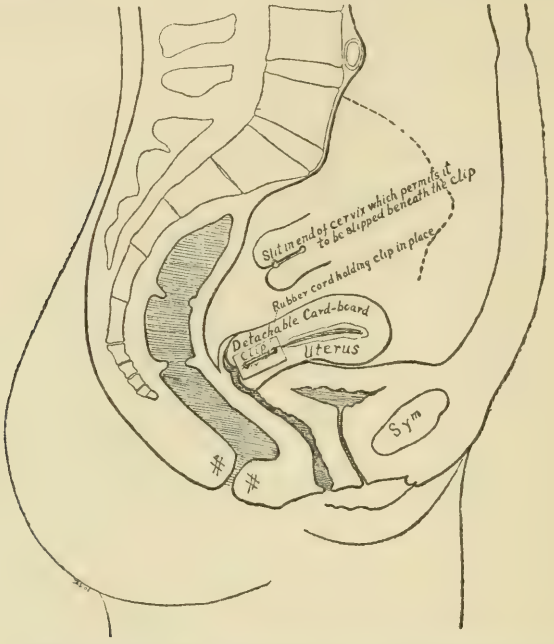
Slit in end of cervix which permits it to be slipped beneath the clip
Rubber cord holding clip in place
Detachable Clip
Card-board
Uterus
Sym

Fig. 1.—Illustration of (mechanical) chart representing the pelvis in sagittal section. The cardboard uterus may be removed and other pieces of cardboard, representing various pathological conditions, may be substituted.

The chart from which the illustration was made represents a natural size sagittal section of the female pelvis; the cardboard uterus is held in place by the clip shown in the drawing. The uterus may be moved about, indicating the effect of distention of the bladder, posture of the individual, etc., and as soon as the uterus is released the elasticity of the rubber cord, holding the clip in place, causes the uterus to return to its previous position. The slit in the end of the cervix (see illustration) permits the cardboard uterus to be removed and other pieces of cardboard, representing abnormal conditions, to be inserted, as shown in the next illustration, thus showing that the normal may be replaced by the abnormal.

The use of mechanical charts as a means of illustrating the problems arising in the various phases of this subject are shown in Figs. 1, 2, 3, 4, 5, 6, 7, and 8.

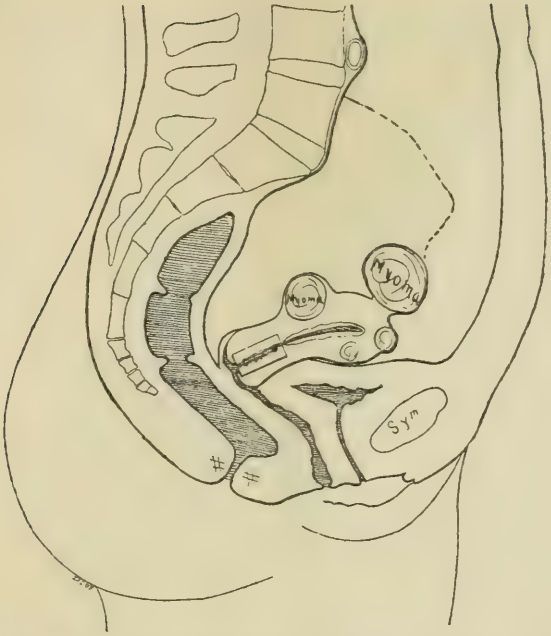

Fig. 2.—Illustration of chart representing a uterus containing several small myomata.

The piece of cardboard representing the normal uterus shown in Fig. 1 has been replaced by one representing a uterus with several small myomata. This uterus may be moved about as in the previous instance.

This illustrated problem is presented to the class, and they are expected to solve it from their knowledge of normal anatomy, normal physiology, the manifestations of these, and the knowledge of the changes caused in the pelvic structures by the condition present. They are aided in this work by asking such questions as these: (1) Describe the abnormal conditions present. How did they rise? (2) Do they interfere with the function of any of the pelvic structures or with the general well-being of the patient? and if so, how? (3) What manifestations of altered anatomy and altered physiology may be noticed by the patient? *i. e.*, what are the subjective symptoms? (4) What manifestations of altered anatomy and altered physiology may be detected by the physician? *i. e.*, what are the objective symptoms? (5) What conditions, already studied, may simulate the present one? (6) How can a diagnosis be made? (7) What should be the treatment of this condition? (8) Can this condition be prevented? and if so, how?

In this way and by means of other methods of illustration, the various conditions arising from or associated with uterine

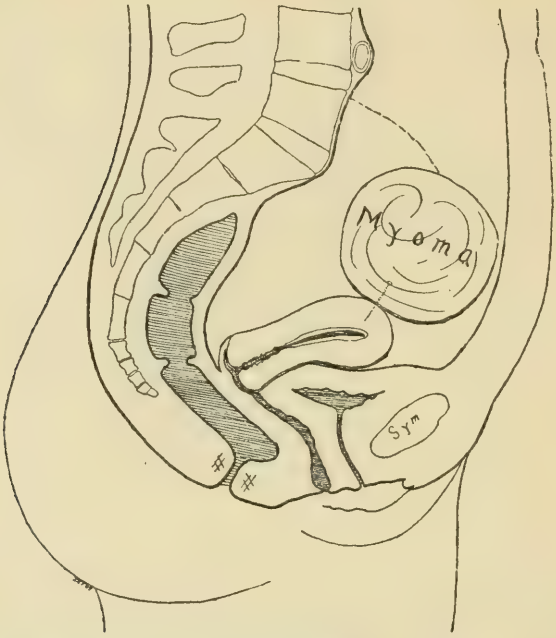

FIG. 3.—Illustration of chart representing a medium size subserous myoma arising from the upper surface of the body of the uterus.

This condition could be represented as in the previous illustration, but is better shown by adding the myoma to the uterus. As myomata may arise in any portion of the uterus, so "artificial myomata" may be added to any portion of an artificial uterus and the resulting conditions indicated and studied. The uterus it made of heavy cardboard, and is held in place by a rubber cord passing through two holes in the cervix, which permits it to be moved about as in the previous chart. The myoma is also made of similar cardboard, and can be attached to any portion of the uterus by means of the pin embedded in it.

The problem is presented and solved by asking questions similar to those asked in the solution of the preceding problem.

myomata may be presented to a class as illustrated problems and solved by them.

At the close of the study of uterine myomata a clinical summary should be given. Their frequency, the age at which they occur, etc., should be discussed. The classification, which is usually presented at the onset of the study of any subject, I believe should be given at the close, as it is

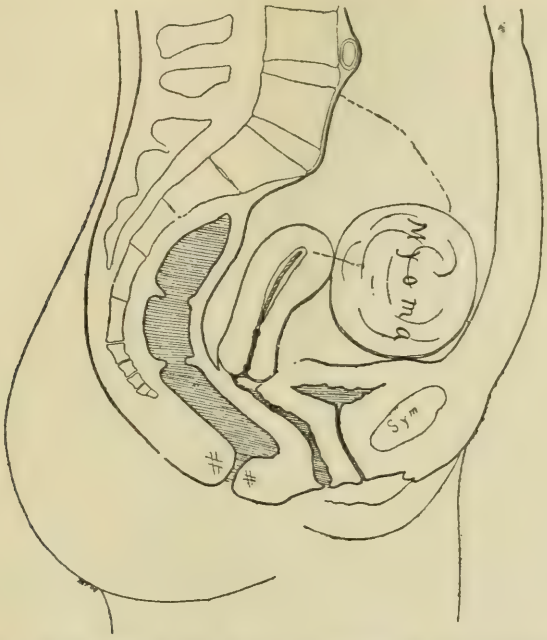

FIG. 4.—Illustration of the chart represented in the preceding illustration, and demonstrating the effect of changing the position of the myoma from the upper to the anterior surface of the body of the uterus. The condition resulting is presented to the class as an illustrated problem and solved as in the previous instance. (See Fig. 2.)

but an enumeration of the various types which have been studied. The one worked out in my course this year was as follows: (1) Small interstitial and subserous myomata—seldom any symptoms (Fig. 2); (2) medium size subserous myomata—may or may not cause any symptoms depending on their situation (Figs. 3, 4, and 5); (3) large subserous

myomata—do not necessarily cause any subjective symptoms; (4) small submucous myomata—may cause bleeding (Fig. 7); (5) large interstitial and submucous myomata—often cause

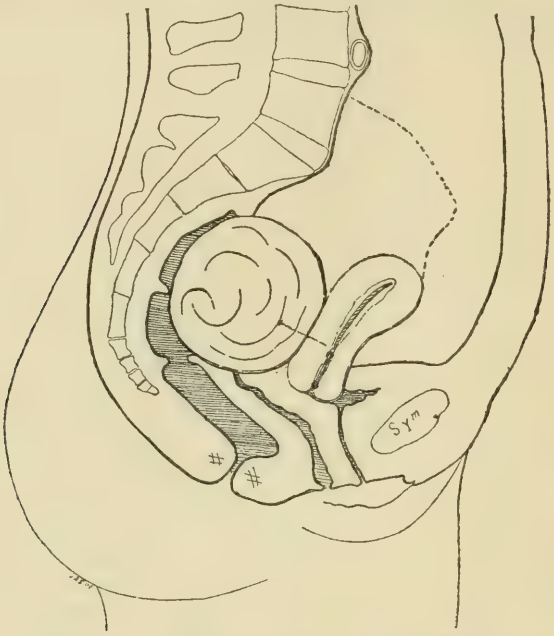

FIG. 5.—Illustration of the same chart shown in Figs. 3 and 4, with the position of the myoma changed to the posterior surface of the uterus.

The change in the position of the uterus is well shown and the change in the rectum and bladder can be imagined or shown by another chart.

The condition resulting is studied as in the previous illustrations.

In this way the conditions resulting from *different sized* subserous myomata in *various situations* may be demonstrated, and these same conditions may be studied as illustrated problems by answering questions similar to those asked in Fig. 2.

This chart may be used in the study of other conditions than uterine myomata by attaching pieces of cardboard, representing these conditions, to the uterus.

bleeding; (8) submucous myomata protruding from the cervix; (7) cervical myomata; (8) adenomyomata; (9) myomata with secondary changes (degenerations); (10) myomata

with other pelvic conditions, as pregnancy, weakened pelvic floor, tubal infection, ovarian cysts, other uterine tumors.

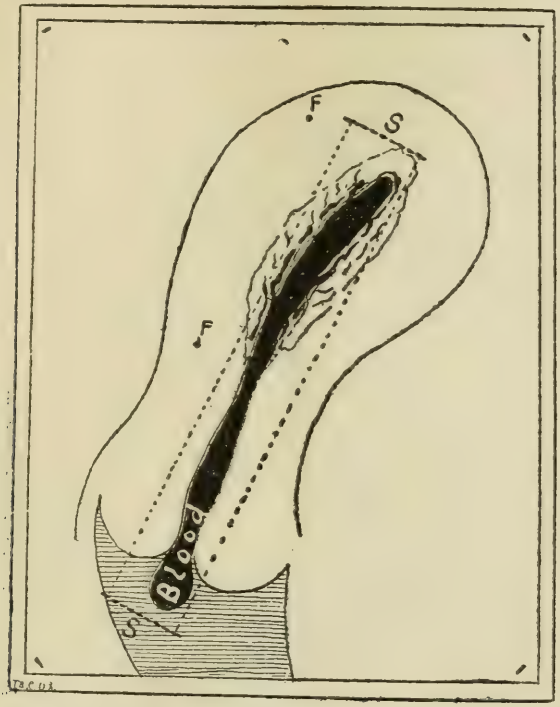

FIG. 6.—Illustration of chart representing normal menstruation.

The chart represents the uterus (in sagittal section) about six times enlarged. The drawing is made on heavy index bristol board, which is attached at its four corners to a very heavy pulp board. The endometrium is thickened, and hemorrhage into its tissues and just beneath the surface epithelium is indicated by red ink (black in the illustration). A strip of cloth about four inches wide (see dotted lines) passes through two slits in the pulp board (*S S* in drawing), so that the cloth lies behind the uterine cavity and portion of the vagina. The uterine cavity and portion of the vagina are cut, and thus the portion of the cloth behind the part cut out is exposed. Half of the cloth is red (black in the illustration), and by drawing the cloth through the slits in one direction the red portion appears, *i. e.*, bleeding, and by reversing the motion it disappears, *i. e.*, the bleeding ceases. The two paper fasteners *F F* are for the purpose of attaching pieces of cardboard representing abnormal conditions, as shown in the next illustration and in Fig. 9.

The student realizes that the symptoms of uterine myomata vary with their size, situation, whether or not submucous,

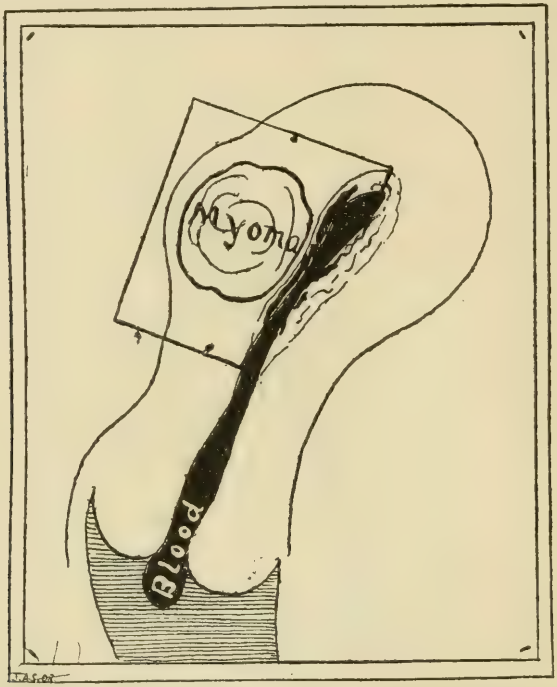

FIG. 7.—Illustration of chart demonstrating the influence of a submucous myoma on menstruation.

A piece of cardboard representing a submucous myoma has been attached to the chart shown in previous illustration by means of fasteners *F F*. The thinning of the endometrium over the tumor is shown, and the local congestion often resulting from the same is indicated by the increased hemorrhage into the tissues of the endometrium at this place.

Menstruation is indicated by drawing the cloth so that the part stained red (black in illustration) appears, and this, with the increased local congestion of the endometrium over the myoma, suggests that a submucous myoma is apt to prolong the menstrual flow and make it more profuse.

with secondary changes, and with associated conditions. He also realizes that often they do not cause any subjective symptoms, but may give rise to certain subjective and

objective symptoms, and, therefore, they should be considered when any of these symptoms are present in a given case.

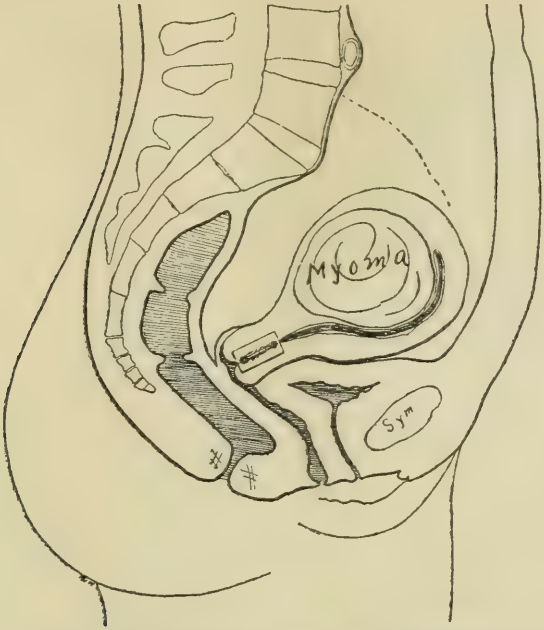

FIG. 8.—Illustration of chart representing a symmetrically enlarged uterus containing a submucous myoma.

This is the same chart illustrated by Figs. 1 and 2, except that a piece of cardboard representing a uterus containing a submucous myoma has been inserted in place of the others.

The problem is presented in the same way as the one shown in Fig. 2.

By this and other methods of illustration other types of uterine myomata may be presented to the class as illustrated problems. (See Fig. 18, which is an illustration of another chart used in the study of uterine myomata.)

The charts represented in these illustrations may also be used in the study of other conditions than uterine myomata by inserting pieces of cardboard representing these conditions in place of the ones shown in the above-mentioned illustrations.

Other abnormal conditions of the pelvic structures may be studied in like manner, some lending themselves to this method of presentation better than others.

SECOND PHASE, THE STUDY OF THE SIGNIFICANCE OF EACH SYMPTOM.

Each symptom (whether subjective or objective) which may be caused by diseased conditions of the pelvic structures is presented to the class for their consideration and is studied by asking the members of the class in turn such questions as will give for their answers the various causes of that symptom, how each cause gives rise to it, and how these causes may be differentiated.

Let us consider the most important subjective as well as objective symptom referable to the pelvic organs, namely, uterine bleeding, as an example of a symptom which is very well adapted to this method of teaching. The members of the class are asked to enumerate the various conditions (already studied) which cause uterine bleeding. Each cause is studied by presenting the illustration previously used to demonstrate how that particular condition gave rise to this symptom in the study of that condition in the first phase of the work. The type of bleeding is now noted, and methods of diagnosis are discussed.

The following illustrations represent the charts used in demonstrating how some of the causes of uterine bleeding give rise to that symptom.

The significance of uterine bleeding is thus appreciated by the student and also that of the various types, *i. e.*, whether or not connected with pregnancy, whether associated with menstruation or independent of it, whether scanty or profuse, frequent or infrequent, with or without pain, in young, middle aged, or those past the menopause. He futhermore appreciates how he should go about to make a diagnosis.

Let us consider the median symmetrical abdominal pelvic tumor as an example of an objective symptom which is well adapted to this method of teaching. This is best shown by

studying the five following illustrations, which represent the charts used in demonstrating how four common causes of this symptom give rise to it.

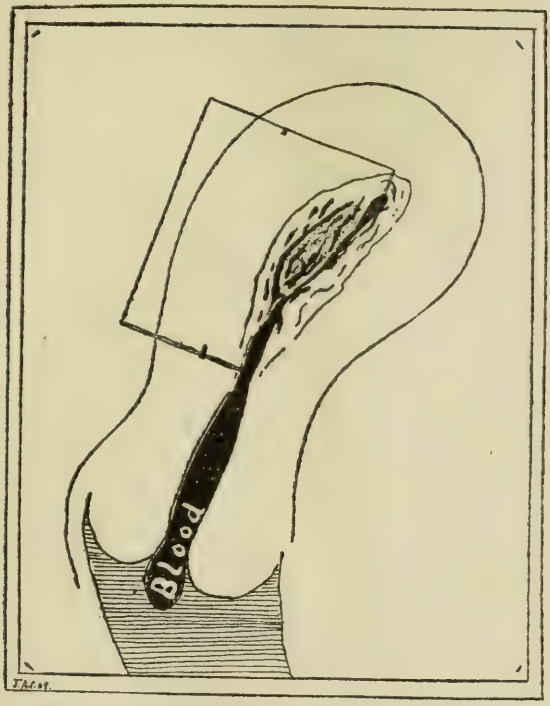

FIG. 9.—The significance of uterine bleeding. Illustration of chart demonstrating how a polyp causes "menorrhagia."

This is the same chart shown in Figs. 6 and 7, and in place of the cardboard representing a submucous myoma, as shown in Fig. 7, one representing a polyp has been substituted. The same chart was used to demonstrate the origin of uterine bleeding in the study of uterine polypi in the first phase.

The problem is presented to the class and solved by asking such questions as these: (1) How does a uterine polyp cause "menorrhagia." (2) What is the type of the bleeding? (3) How can a diagnosis be made?

The piece of cardboard showing the polyp may be substituted by others representing a submucous myoma (as already shown), a portion of retained placenta, hypertrophy of the endometrium, and cancer of the body of the uterus. Each of these conditions often gives rise to the same type of bleeding, *i. e.*, a "menorrhagia," and each may be presented and studied as the one just shown.

The student thus sees how the various conditions which may give rise to a median symmetrical abdominal pelvic tumor cause it, viz., by occupying that part of the body. He also appreciated how these conditions may be detected.

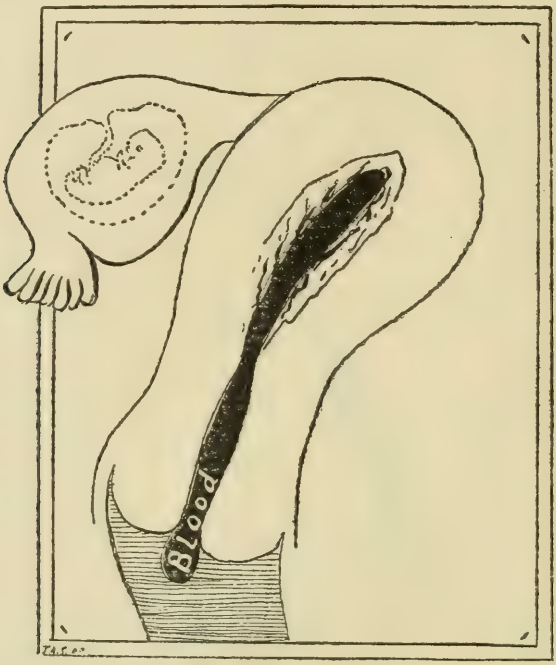

FIG. 10.—Illustration of chart demonstrating the source of "irregular menstruation" in tubal pregnancy.

This is the same chart shown in the preceding illustration. The piece of cardboard representing the polyp has been removed and a piece of cardboard representing a tubal pregnancy has been inserted in a slip made to receive it.

This problem is presented and solved as the preceding one, *i. e.*, by asking such questions as these: (1) How does tubal pregnancy cause uterine bleeding? (2) What is the type of the bleeding? (3) How can a diagnosis be made?

In like manner the other subjective and objective symptoms may be studied; but all are not as well adapted to this method as the two just presented.

THIRD PHASE, THE STUDY OF THE ART OR TECHNIQUE OF GYNECOLOGY.

Proficiency in this art, whether in "taking histories" or detecting the manifestations of altered anatomy and altered physiology (physical examination), or carefully considering each datum obtained and from this consideration determining the condition present (making a diagnosis) or treatment, requires actual clinical experience on the part of the student, in the dispensaries, wards of our hospitals, and in private practice. I believe that this phase of the subject is best taught by dividing the class into small groups of two or four men—two if feasible—and permitting them to study the cases in the dispensaries and wards of our hospitals. Charts, models, specimens, etc., are also of great value in this work as a means of demonstrating the probable origin of the symptoms present in a given case and also enabling a comparison with other conditions. I have a series of casts representing the various conditions appearing about the vulva and perineum—as newgrowths, cystocele, retrocele, and prolapsus—and another series representing various conditions of the cervix. I have used various materials in making these casts, as plaster of Paris, clay, "plasticine," wax, printer's roller composition, and rubber, each having its own field of usefulness.

Case teaching gives practice in the process of reasoning so essential in making a diagnosis, and it is particularly applicable in teaching gynecology when clinical material is often inadequate.

The method of presenting abnormal conditions as illustrated problems may also be used in examinations, as, for example, the mid-year examination in gynecology this year, for the senior class of the Albany Medical College consisted of a life-size representation (shown in sagittal section) of the

conditions found in an actual case. The conditions present were a dermoid cyst of the right ovary situated anterior to

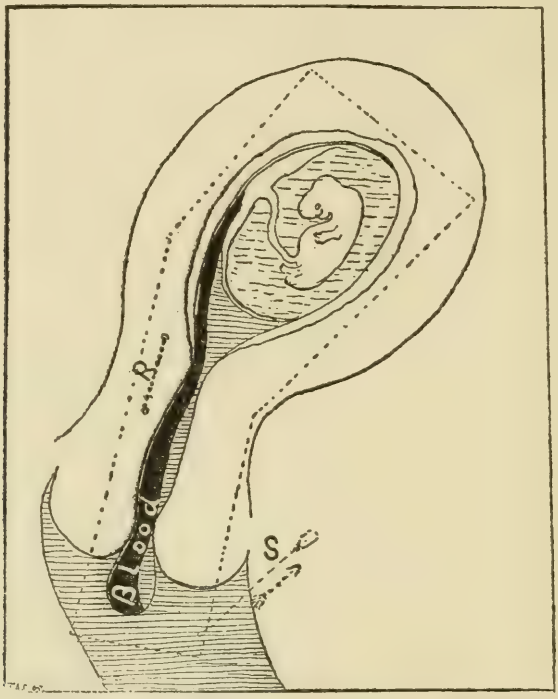

FIG. 11.—Illustration of chart demonstrating the source of uterine bleeding in threatened abortion.

The chart is the same size as the preceding ones, and represents the uterus in sagittal section. The uterine cavity and portion of the vagina have been cut out, and back of this chart is placed a piece of cardboard (see dotted lines) on which is represented the contents of the uterus and vagina which has been cut out. The rest of this piece of cardboard is painted red (black in illustration) to represent blood. The cardboard is held in place by a rubber cord (*R*), and a piece of string (*S*) is attached to its lower right-hand corner. When the piece of cardboard is in place one sees the pregnant uterus in sagittal section and no evidence of bleeding, but on pulling the string, as indicated by the arrow, the cardboard is pulled to one side, thus separating the placenta from its attachment to the uterus, and the portion colored red appears as shown in the illustration by the black ink.

This chart is studied as the preceding one.

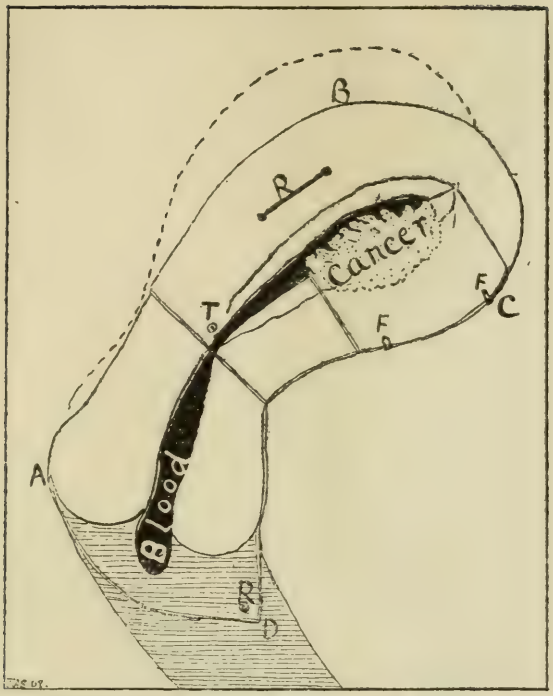

FIG. 12.—Illustration of chart demonstrating the source of uterine bleeding in early cancer of the body of the uterus.

The uterus and portions of the vagina, *A B C D*, consist of two pieces of cardboard fastened together by a rivet (*T*) at the level of the internal uterine os. The cardboard uterus is attached to the chart by the rubber cords *R R*. The rivet and rubber cords permit the uterus to be moved about as occurs in straining, etc. The uterine cavity has been cut out as in the preceding illustration, and the chart, just behind the portion that has been cut out (uterus in normal position), is colored to represent the uterine cavity, while just about this area the heart is colored red (black in illustration).

When the uterus is in normal position, as indicated by the dotted lines, there is no evidence of bleeding, but on pushing the uterus downward and increasing the anteflexion, as may occur in straining, the uterus is displaced so that the red (black in illustration) appears in the uterine cavity and portion of the vagina which has been cut out, and thus bleeding is indicated.

The chart is studied as the preceding one. (See Fig. 10.) The piece of cardboard representing the cancer is held in place by two clips, *F F*, and other pieces of cardboard may be substituted representing other conditions, as in the chart illustrated by Fig. 9.

the uterus and extending as high as the umbilicus; two cervical polypi were also present, and the pelvic floor had been injured in childbirth, with a resulting cystocele and rectocele.

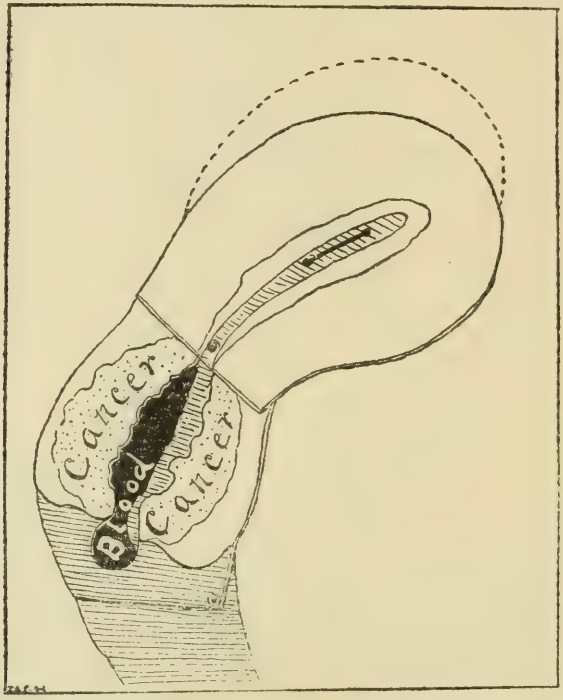

FIG. 13.—Illustration of chart demonstrating the source of uterine bleeding in cancer arising in the cervical canal.

The chart is very similar to the one represented in Fig. 12, except that the uterine cavity has not been cut out, but only the cervical canal and portion of the vagina.

When the uterus is in its normal position, as indicated by the dotted lines, there is not any evidence of bleeding, but when it is pushed downward and its anteflexion is increased, as in straining, the uterus is so displaced that the red (black in illustration) appears in the cervical canal and portion of vagina which has been cut out. Bleeding then arises when the patient strains, thus bending and cracking the friable cancerous tissue.

The chart is presented and studied as the preceding ones. (See Fig. 10.)

The members of the class were asked to solve the problem as indicated in Fig. 20.

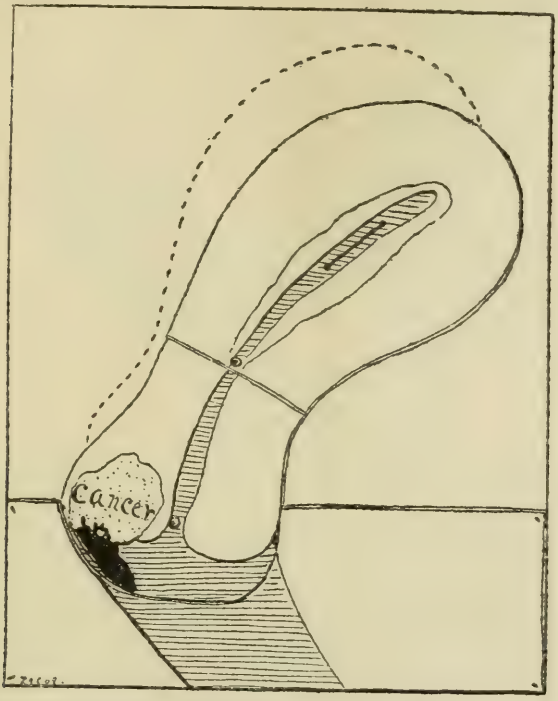

FIG. 14.—Illustration of chart demonstrating the source of uterine bleeding in an early "inverting" cancer arising in the vaginal portion of the cervix.

The chart is very similar to the one represented in Fig. 13, except that only a small portion of the vagina is cut out, as shown in the illustration by the black area.

When the uterus is in its normal position, as indicated by the dotted lines, there is no evidence of bleeding, but on pushing it downward, red (black in the illustration) appears in the abortion of the vagina cut out. This chart suggests that in this type of cancer the bleeding is apt to occur on straining when the cancer is injured by compressing it or forcing it against the posterior vaginal wall, and it also suggests that the bleeding is slight and inconstant. The chart is presented and studied as the preceding ones. (See Fig. 10.) Eversion of the cervical mucosa due to laceration, cervical polypi, and also other types and stages of cervical cancer can be presented in like manner.

The question naturally presents itself, What has been the result of this "problematical" method of teaching? I have used it for two years, and feel that it is still in its experimental

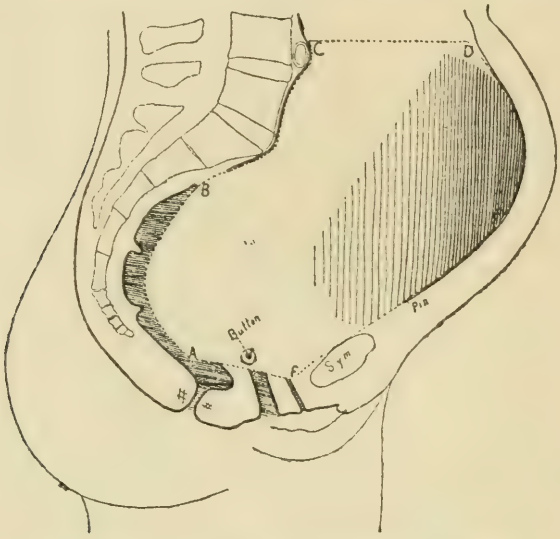

FIG. 15.—Illustration of chart representing a median symmetrical abdominal pelvic tumor whose cause is not apparent.

The chart from which this illustration was made represents the lower abdomen and pelvis in sagittal section. As indicated in the illustration, a median abdominal pelvic tumor is present, but the cause is not apparent. The area *A B C D E F* which might be occupied by such tumors has purposely been left vacant.

The class is asked what conditions, which they have studied, may give rise to such a tumor. Each of these conditions is studied by inserting a piece of cardboard representing the condition, which fills the area *A B C D E F* and thus completes the picture and gives the explanation of one cause of a tumor of this kind in this situation. (See next illustration.) The button, held in place by a rubber cord, and the pin for the purpose of holding the pieces of cardboard in place which are to complete the picture.

stage and is capable of greater development. I believe that I handled the subject better this year than last year, and hope to improve it in succeeding years. The results of this method

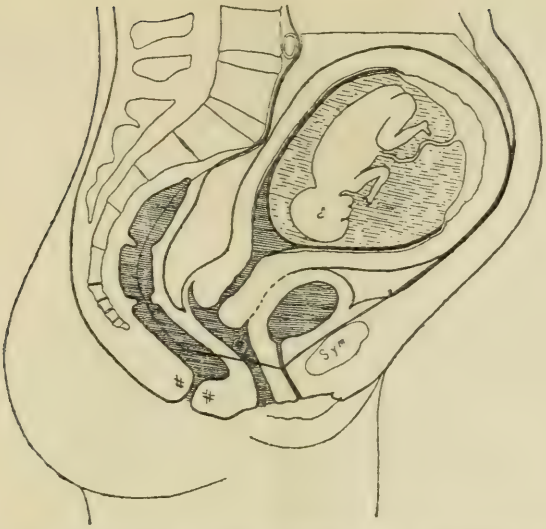

FIG. 16.—Illustration of chart showing how pregnancy causes a median symmetrical abdominal pelvic tumor.

This is the same chart represented in the preceding illustration, but the area *A B C D E F* has been covered by a piece of cardboard of the size and shape of the area and representing a pregnant uterus. This piece of cardboard is held in place by the button and pin mentioned in the previous illustration. The picture shown in the previous illustration is thus completed, and demonstrates how pregnancy may give rise to a tumor in this situation. This chart was used in the study of pregnancy in the first phase of the work, and then the problem of pregnancy at this stage was solved by asking such questions as these: (1) Describe the condition present? (2) Does it interfere with the function of any of the pelvic structures or with the general well-being of the individual? and if so, how? (3) What manifestations of altered anatomy and altered physiology may be noticed by the patient? *i. e.*, what are the subjective symptoms? (4) What manifestations of altered anatomy and altered physiology may be detected by the physician? *i. e.*, what are the objective symptoms? The chart demonstrates that one of the most important objective symptoms is the median symmetrical abdominal pelvic tumor.

The present problem of the significance of a median symmetrical abdominal pelvic tumor is now partly solved by asking such questions as these: (1) How does pregnancy cause a median symmetrical abdominal pelvic tumor? (2) What is the type of tumor, *i. e.*, describe its physical characteristics? (3) How can a diagnosis be made?

at the end of the first year encouraged me to place the illustrated problems in book form, so that the students might study them before discussing them in class, and also that each one might have, at the end of the course, a book for future reference. Many of the illustrations in the book are reproductions of the illustrations used in presenting the problems.

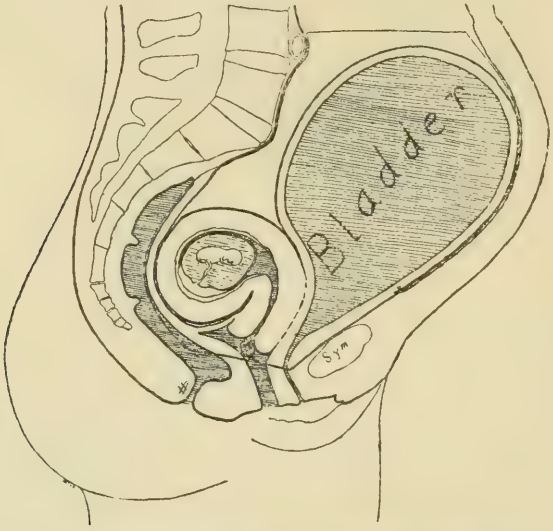

FIG. 17.—Illustration of a chart showing how a full bladder causes a median symmetrical abdominal pelvic tumor.

This is the same chart represented in the preceding illustration, except that the piece of cardboard representing a normal pregnancy has been replaced by one representing a full bladder caused by a retroflexed pregnant uterus (from an actual case). This completes the picture and shows how this condition causes a tumor in this situation.

This problem is presented and solved as was the preceding one.

Each illustration in the book bears an explanatory legend and is accompanied by questions which indicate how the problem should be solved. Space is left after the questions for answers and notes, which, when filled, should constitute our present knowledge of the subject. It is not intended that the book should take the place of the charts and other

methods of illustrating the problems mentioned in this paper, but to supplement them. The subject matter of the book has been so arranged that each advance is a natural outgrowth of what has preceded. As a result of the use of this book,

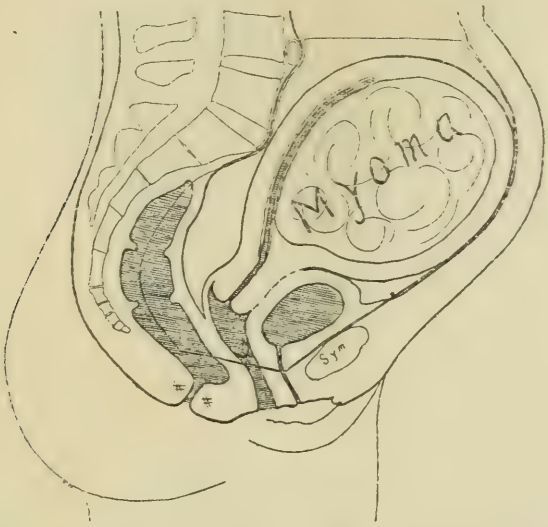

FIG. 18.—Illustration of a chart showing how a uterine myoma may cause a median symmetrical abdominal pelvic tumor.

This is the same chart represented in the preceding illustration, except that the piece of cardboard representing a full bladder has been replaced by one representing a myomatous uterus. This also completes the picture and shows how this condition causes a tumor in this situation (from an actual case). The chart thus completed was used in the study of uterine myomata in the first phase of the work, and then the problem of this condition was solved by asking the questions asked in Fig. 2.

The present problem is now presented and solved as were the two preceding ones. (See Fig. 16.)

each student will have studied and in a measure written and indexed a treatise on gynecology and one that he may not only use as a reference book, but to which he may add new material at any time. I have called this work "Studies in Gynecology Presented in the Form of Illustrated Problems for Class-

room Work." It is published by the Brandow Printing Company, of Albany, N. Y.

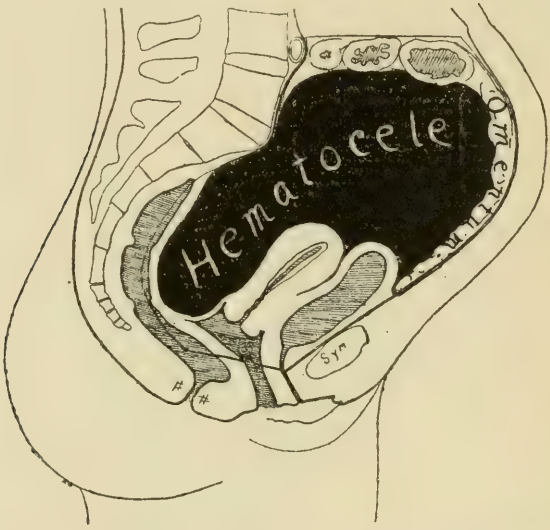

FIG. 19.—Illustration of a chart showing how a hematocele may cause a median symmetrical abdominal pelvic tumor.

This is the same chart represented in the preceding four illustrations, with a piece of cardboard representing a hematocele covering the area *A B C D E F*. This piece of cardboard completes the unfinished picture shown in Fig. 15, and shows how a hematocele may give rise to a median symmetrical abdominal pelvic tumor (from an actual case). The chart thus completed was used in the study of this condition in ectopic pregnancy.

The problem is presented and solved as were the three preceding ones. (See Fig. 16.)

In like manner other causes of this symptom may be presented and solved, such as an ovarian cyst, pelvic abscess, abdominal pregnancy, etc.

Similar charts may be used to study the significance of tumors in other situations.

The remarks made in regard to the "problematical" method as a whole likewise apply to this book, *i. e.*, it is in its experimental stage.

In closing, I wish to emphasize what seems to me to be the chief advantages of teaching gynecology along the lines which I have endeavored to present in this communication.

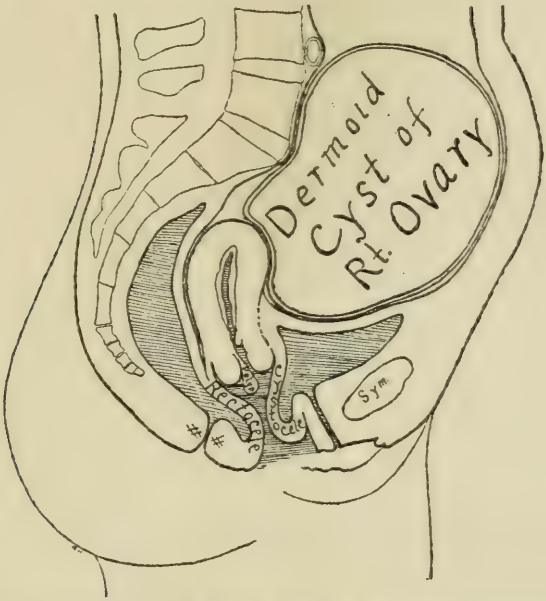

FIG. 20.—Illustration of chart used in mid-year examination in gynecology.

The students were told the conditions present in an actual case, and the case was presented to them as an illustrated problem, which they were asked to solve by answering these questions:

1. How did the conditions present in this case probably arise?
2. What would be the probable subjective symptoms and their origin?
3. What should be detected on examining the patient?
4. What other conditions might simulate the ones shown here?

It may be seen that, in order to answer these questions, quite an extensive review of the subject of gynecology must be made, and that the conditions presented were those found in an actual case and also those which will be encountered by the students in their future clinical work.

1. By studying the subject in the three phases mentioned, the student should develop an excellent foundation for his

future clinical work. In the first phase he learns how the normal becomes abnormal and studies the abnormal conditions of disease as seen in the pathological laboratory, and sees how the various symptoms arise. In the second phase he studies the significance of the various symptoms caused by the abnormal conditions studied in the first phase, and learns how these conditions may be differentiated. He is thus prepared to begin the third phase with a clearer understanding of the various causes of the symptoms he is about to learn the art of detecting, and with a clearer insight into diagnosis and treatment, because he has a clearer conception of the conditions which may be present, how they arose, how they cause symptoms, and what these symptoms may be. In the third phase he should be taught the art or technique of physical examination, diagnosis, and treatment, by actual contact with the patient in the ward and dispensaries of our hospitals.

2. By working out, himself, the correlation between normal anatomy, normal physiology, and the manifestations of these on the one hand, and altered anatomy, altered physiology, and the manifestations of these, on the other, he realizes that all symptoms of disease are but manifestations of normal anatomy and normal physiology as altered by some abnormal condition. He therefore knows, when an abnormal manifestation is present, that there is an abnormal condition causing it, and that it is the cause which demands his attention; and, furthermore, he knows that he should determine the cause from his knowledge of normal anatomy, normal physiology, the manifestations of these, and a knowledge of the changes caused in the above by the various pathological processes called disease.

3. By arranging the subject so that each step is but a further development of preceding ones, and by showing how the various conditions occurring in the course of each disease arise, and by presenting these conditions as *illustrated prob-*

lems which the student can see and touch, he is able to use these special senses, and with his knowledge of the subject he attempts to solve these problems himself. The students' answers corrected, when necessary, and supplemented by information which they cannot be expected to reason out, should constitute our present knowledge of the condition under discussion.

4. By means of special "mechanical" charts the development of many abnormal conditions may be indicated, the conditions resulting may be shown diagrammatically and especially with a view to the explanation of how these conditions alter the manifestations of normal anatomy and normal physiology, *i. e.*, how they give rise to symptoms and what these symptoms are.

5. By presenting these problems in book form the student is able to study them before coming to class, and at the end of the course has a text-book for future reference.

6. By following out this general plan of instruction each student will have been taught to observe, to use what knowledge he already has in solving problems new to him, and will have studied and, with assistance, solved the various problems in gynecology, instead of memorizing data obtained from didactic lectures and text-books. In addition, he will have written a text-book which he not only had for future reference, but also one to which he may add new material at any time.

DISCUSSION.

Dr. August Martin.—I have been very much interested in this paper. We should avail ourselves of every possible aid and means in teaching diagnosis. My long experience as a teacher has taught me that it is difficult for pupils to get a clear conception of conditions as they exist from what they feel. The development of touch is one of the greatest essentials in our gynecological and obstetrical work. When I instruct my pupils to make a sketch or a diagram of what they feel after making examinations, I find they have very curious ideas. Now we have a large number of schemata and a large number of these mechanical preparations, which are great helps in teaching diagnosis. My experience has taught me that it is very important to have pupils, and even physicians make sketches of what they feel during their examinations of patients. Many of you perhaps are familiar with a little book of such schemata that has been published by Schultze, of Vienna, in which the different organs—uterus, bladder, vagina, perineum, rectum, etc.—are clearly mapped out. Students tell me they learn a great deal from the sketches they make after examinations. They are a great help in determining normal as well as pathological conditions within the pelvis.

So far as I have been able to observe, you have one great difficulty to contend with in America which we have not in Germany, namely, the lack of material for the practice of frequent examinations of pregnant women. In Germany these women are at the disposal of medical students, so that examinations can be made from time to time to see how pregnancy is progressing and whether any abnormal conditions are likely to arise. I regard this as an important part of our teaching. This method of teaching is practised every week, classes of students being taken to these women for the purpose of examining them, and those students have told me that this teaching has been of incalculable benefit to them in their practice in future years.

Again, for teaching purposes we use pelvic manikins in our German clinics. These are not generally used in America, although I understand they are used in Chicago and in

San Francisco. Obstetrical operations can be very well taught by the use of these manikins.

Dr. J. Riddle Goffe.—This scheme of teaching gynecology as presented by Dr. Sampson, seems to be founded on correct principles. One great fundamental in teaching gynecology, as in every other branch of instruction, is to make students think. This is accomplished by a systematic quiz far better than by a didactic lecture. We should endeavor to keep constantly before their minds a picture of the condition we are talking about, so that they may develop the habit of pictorial imagination. The latter is very essential in making diagnoses of conditions in the concealed cavities of the body. The diagnostician must be able in his imagination to picture the entire contents of the abdominal or pelvic cavity. This is an acquired habit and the student must be made to understand that unless he acquires it the scope of his diagnostic field must exclude those two regions. The pictorial imagination can be cultivated in two ways: First, by movable charts or manikins, as presented by Dr. Sampson, and, second, by the use of a blackboard. In my experience nothing has been of so great assistance as a blackboard and a piece of chalk. The pelvic and abdominal cavities can be readily outlined by free-hand drawings. The organs are then filled in in normal condition. These, any or all, can be erased and modifications substituted to represent any pathological conditions, a clear picture of varying conditions in the same pelvis being constantly presented to the student's eye. A touch course, as Dr. Martin has pointed out, is very important, but a man can touch and keep on touching, but unless he utilizes his mind in this pictorial way with it, it accomplishes nothing. The sense of touch gives a man a picture, and if he uses his mind in conjunction with it he can develop that picture so as to have a perfectly clear idea of the conditions in the pelvis. Tactus eruditus does not reside in a man's fingers, but in his brain. I find this rather difficult to impress upon students. Tactus eruditus simply consists in the faculty of forming a mental picture from what is felt. He must follow his finger in his imagination. He must make a mental picture of what he touches and elaborate that picture in accordance with what the pelvic or abdominal conditions may be. In this way he becomes a skilled diagnostician.

Why is it that the gynecologist is a better abdominal diagnostician, as a rule, than the general surgeon? Simply because through constant practice he has developed this pictorial imagination, this tactus eruditus, to a more perfect degree.

Dr. F. Hurst Maier.—The method of teaching gynecology that we have been pursuing for the past two years in the Jefferson Medical College has proved most satisfactory. We know that we cannot make gynecologists out of fourth-year students, but we can give them a fair knowledge of the pelvic organs and teach them the ordinary points in diagnosis, as well as impressing them with the necessity of early diagnosis in carcinoma uteri and extra-uterine gestation.

They are taught the theory of the subject in their third year, and the fourth year is devoted to giving them as much practical work as is possible.

Besides the weekly general clinic and lecture, daily demonstrations are given in the gynecological operating room. For these demonstrations the class is divided into groups containing about twenty men each. Cases are brought in, anesthetized, and the men, under the supervision of an instructor, allowed to examine them and make their diagnoses. The necessary operations are done immediately afterward.

The instruction thus given during the examinations and succeeding operations not only gives the students a very comprehensive idea of gynecological diagnosis, but carries with it the particular treatment necessary for the cure of the patient.

The men are also assigned in pairs to duty in the out-of-door department of the hospital, where further instruction in diagnosis and in conservative treatment is given.

I do not know of any better method of teaching gynecology to students than to have them examine patients in vivo and to see them operated on immediately afterward. The mistakes in diagnosis become apparent, and they are able to profit by them.

CYSTOCELE.

By I. S. Stone, M.D.,
Washington, D. C.

The operation which has been most successful for the relief of cystocele, is that which has for its object the liberation and elevation of the bladder from its prolapsed position to a new or higher position in the pelvis, where it has additional support from the strong layers of pelvic fascia to be found between the vaginal and the bladder itself, and also a new support from the uterus upon which it is elevated. Various methods of accomplishing this purpose have been exploited and have been more or less successful, because they have to a greater or less degree involved a complete separation of the bladder from the vaginal wall or uterus, or both. Some of the writers have used the word "uterine interposition" for the purpose of explaining the new position of the bladder which is placed upon the uterus, which in turn is generally secured to the anterior vaginal wall—"vaginofixation." The former operations for cystocele which depended upon a denudation of the vaginal wall have, we believe, generally been abandoned by operators, and even the very conservative surgeons who do not use the modern flap-splitting operation obtain a thorough exposure of the fascia by cutting away the vaginal wall, although they do not make a separation of the bladder from the uterus or vagina.

Among those who soon recognized the inefficiency of the former methods we find among others our countryman,

Hadra,[1] of Texas (1895), who introduced the theory of prolapse of the bladder and vagina due to a separation of the vagina from the cervix uteri.* He says: "The cervix is firmly grasped with a strong vulsellum on the posterior lip, and dragged down to a convenient extent. On the brim of the anterior lip, about one-quarter inch distant from the os, a crescentic incision is made through the vaginal cover and carried up on each side of the cervix for one or one and one-half inches, according to the amount of slackening. The vaginal flap is then lifted up from the cervix by finger or blunt instruments until it can be pulled well upward toward the roof of the vagina and enough to undo the pouching; in other words, until the cystocele disappears. If the flap be too long and flabby a transverse piece may now be resected, then the reattachment has to be made. The operator puts his index finger between the denuded cervix and vaginal flap as high up as possible, in order to lift the bladder out of the way, and while an assistant is pulling the cervix down by the vulsellum, a disinfected silk suture is inserted, tacking the vaginal flap to the cervix in a transverse line. Then the wound is closed. This proceeding simply reunites the detached vagina to the cervix and does away with the cystocele." Hadra is silent regarding the separation of the bladder from the uterus or vagina.

Winter (1896) seems to use a method somewhat similar to that of Hadra, and in addition detaches the bladder from the anterior vaginal wall.

Separation of the bladder from the vagina was practised by Kreutzmann[2] prior to 1896 as a step in the operation of hysterectomy for prolapsus uteri and cystocele. He made a complete separation of the bladder from the vagina "far back on the sides and from the uterus." Large flaps were removed from both sides of the vaginal incision and the wound

* He illustrates his article with two cuts, which show the pathology as he found it or as it appeared to him.

carefully closed with silkworm gut. His patient had uterine and bladder prolapse and he removed the uterus as a part of the operation for the cure of the cystocele.

Sänger,[3] of Leipzig, appears to have been the first to report an extended experience with what he calls "lappenspaltung," or flap-splitting. His method was certainly a distinct advance and he reinforced his position in subsequent papers (1894[4]). Sänger approves of bladder separation from the anterior vaginal wall, but opposes the more radical method of separation of the bladder from the anterior uterine wall.* Sänger mentions Arx[5] as a pioneer in the use of a method similar to his own which we find in the *Korrespondenz–Blatt f. schweizer Aertze*, Basle, 1896 (same, 1897[6]).

Arx anticipated some descent of the uterus and practised cervix amputation, along with bladder separation from the anterior surface of the uterus, in his operations for cystocele. He does not entirely open the space between the bladder and uterus; or, in other words, leaves the peritoneal reflexure unbroken. While the author of the above method appears to have been the first writer to mention this feature of the operation for cystocele ("cystocele elevation")—and he has Sänger's word for it—still we find that he (Arx) says that Gersuny did identically the same thing and that he did it independently of him.

In addition to bladder separation, Gersuny[7] offers a modification which we recognize as adapted from Emmet or Stolz, *i. e.*, an inversion of the bladder by purse-string suture of its base after separation from the vagina. He elevates the bladder by turning its mucosa upward ("einstülpung") into a ridge or cone within the bladder, leaving its interior basal portion as in the operation proposed by our honored com-

* Sänger says: "Auch bei der Hadraschen und v. Arxschen Operationen welche ich sonst für wohl durchdacht und rationell ansehe, wird wohl ebenfalls das Collum durch den Narbenzug stärker nach vorn dislocirt werden, wie auch bei allen misslungenen Vaginifixuren."

patriot, Emmet. Difference is, however, at once apparent, for he first separates the bladder from the anterior vaginal wall, then excises the long flaps and unites the free edges after the bladder has been treated by its inversion and suture as above stated. The experience of this writer (Gersuny) has been like that of the author: he thought himself a pioneer when he first performed and reported his operations. He was, however, corrected by Sänger himself.

Mackenrodt[8] not only has the honor of the "vaginofixation" operation associated with his name, but he has also described his modification of the operation as applied to cystocele.

By the method of Wertheim[9] (reported in 1899) a transverse incision is made over the cystocele, and the bladder is separated as usual from the uterus and anterior vaginal wall. The vaginal flaps are incised and the uterus is drawn into the vagina and there made fast; posterior uterine, to the anterior vaginal wall. The cervix is left free. The operation is called "introvaginal vaginofixation." (Wertheim claims 93.75 per cent. cures.)

In a recent periodical (*Gyn. Rundschau*), Schauta[10] tells us that he calls this operation "interposition" of the uterus between the vagina and bladder. He discussed the subject in the *Wiener Gynäk. Gesellschaft, vide Trans.*, März 21, 1899. He does not always recommend entire separation of the vesico-uterine fold, but prefers the extraperitoneal method. He amputates the cervix if necessary, but is not inclined to make this a rule. He has used the "extraperitoneal vaginofixation interposition method since 1889 in at least ninety cases without modification." He declares the method is identical with that of Mackenrodt, Steinbüchel, and Lott. In the severe cases he opens the plica anterior and elevates the bladder upon the uterus, which in turn is embedded between the vaginal wall and bladder.

The technique of Dührssen[11] in the treatment of prolapse

of the uterus and bladder was announced in 1901. He practised this method in 1894, and gives Schücking[12] the credit for the suggestion that vaginofixation would cure prolapse. He includes the cystocele or prolapse of the bladder with that of the uterus and his method, which is similar to that of Schauta, Wertheim, and others, involves the following:

1. The resection of the excessive vaginal portion.
2. The making of a firm pelvic floor.
3. The restoration of the normal size and position of the uterus.
4. An appropriate treatment of the cystocele.

The operation is very similar to that practised by many American surgeons, except in being an intraperitoneal operation. The space between the bladder and uterus is opened widely, and the uterus is then brought forward under the bladder and sutured to the vaginal wall. If the uterus is large and the cystocele small, it will be impossible to close the vaginal wall over the uterus, as shown in the *Operative Gynecology* of Döderlein-Krönig. It is, therefore, very important not to cut away vaginal flaps until the uterus is placed in its new position and the flaps tentatively placed over the fundus and anterior wall.

We find that elevation of the bladder has been extensively tried by some French surgeons. In 1889 and 1890, Vlaccoz, Dumoret, Tuffier, and Laroyenne used a method of "cystopexie." Laroyenne[13] dilated the urethra and introduced his finger into the bladder as the sutures were applied. The operation was essentially like a suspension of the uterus, "hysteropexie" or "cystohysteropexy."

Other French operators used methods very similar to that of Mackenrodt, as Villa,[14] Aubeau,[14] and Delbet.[14] The latter performs hysterectomy and then uses the round ligaments to serve as suspensors to aid in supporting the vaginal walls and pelvic viscera. Delanglade[15] treats cystocele by

resecting the pelvic diaphragm: "Myorraphie a eté faite an avant et au-dessus du vagin, en arrière et au-dessous de la vessie." He uses a transverse incision of the anterior vaginal wall, separates the bladder from the vagina, and then resects the vaginal flap. The flap-splitting method has been used by Pozzi, Quenu, Jacobs, and many others, but the literature shows that the French surgeons make less use of the method than the Germans.

We also note the operation as announced by Alexandroff[16] in 1903. This operation is intended for the relief of retroversion of the uterus, and for prolapse of the uterus and bladder. The vagina is opened in the median line, the bladder separated from the uterus, but the peritoneal cavity is not opened. The operation is entirely extraperitoneal. The ureters are elevated and the broad ligaments with the parametrium are brought forward in front of the uterus and secured in such a manner as will take up the slack in both ligaments and vaginal wall. The author claims that the cervix is drawn upward and backward, which, if true, is a most desirable result. Tweedy[17] describes a similar method. He opens the space between the bladder and the uterus after separating the bladder from the vagina. Douglas' cul-de-sac is now opened and the broad ligaments are hooked with the finger and brought forward and sutured in front of the uterus. The "ligamentum coli transversalis" of Mackenrodt is utilized in this way, and it is claimed by the author to have given a substantial support to the uterus and bladder. The union of the ligaments to the cervix is made just above the portio as the author amputates the cervix and finally secures the fundus to the anterior vaginal wall. It is taken for granted in the above methods that the authors resect the vaginal flaps before concluding the operation.

Dr. E. Reynolds,[18] of Boston (1902 and 1907), has made use of the same principle as used by Alexandroff and Tweedy, in which the cervix is drawn upward and backward. The

operation is entirely completed without separation of the bladder from the vaginal wall or uterus, it being possible, in the author's opinion, to accomplish the elevation of the cervix and the bladder without the more radical operation.

One of the first American operators to separate the bladder from the uterus for the relief of retroversion and cystocele was Watkins,[19] of Chicago (1899). "The uterus was curetted and separated from the vagina by a circular incision. The bladder was separated from the uterus by blunt dissection and the peritoneal cavity opened in front of the uterus. The anterior wall of the uterus was grasped by bullet forceps and the organ anteverted. About two inches of the upper portion of the anterior vaginal wall was excised. The anterior vaginal wall was now sutured to the upper border of the broad ligaments lateral to the uterus, and to the fundus of the uterus with silkworm-gut sutures. The posterior vaginal wall was incised, longitudinally in the median line, from the cervix downward about one inch, so as to allow the cervix to be displaced upward and backward. The wound in front of the cervix was now closed by silkworm-gut sutures inserted transversely; that is, parallel to the line of incision anterior to the cervix." The operation was concluded by passing a suture through the posterior lip of the cervix and the incision in the posterior vaginal wall. Watkins,[19] like many others, acknowledges the use of the vaginofixation principle in his operation (see page 422, line 4 from bottom). In a recent communication, Dr. Watkins says his views have not changed very much since writing the paper on his cystocele operation. He has had three cases where trouble resulted later from a protrusion of the fundus uteri. He has been disappointed with shortening of the broad ligaments in front of the cervix, although he believes that the lower segment of the uterus and the broad ligaments can be saved and used to a great advantage in closing the herinal opening through which the bladder is prolapsing. In extensive

cases he amputates the fundus and occasionally dissects out the entire endometrium.

In the writer's[20] first paper (read December 7, 1899) he begins the description of his method as follows: "The crescentic incision is made over the cervix as in beginning vaginal hysterectomy. The bladder is pretty widely separated from the uterus and broad ligaments, and the edge of the incised vagina sutured to the anterior surface of the uterus as high as the insertion of the round ligaments if possible." We then proceeded to further elevate the bladder upon the fundus through an abdominal incision and also to make ventral fixation of the uterus if necessary. (In this article we also acknowledge our indebtedness to Mackenrodt for the suggestion of his operation called "vaginofixation," which all agree was the immediate forerunner of the improved operation for cystocele.)

The ease with which the bladder was separated from the uterus in vaginal hysterectomy soon led to an extensive detachment of the bladder from the vagina, and the author's papers of 1901 and 1902 show the changes in technique. The preference now is for the "interposition" operation, much like that of Dührssen and Schauta, save in the cases requiring an abdominal section, in which we use a ventrofixation to supplement the Sänger operation.

Dr. Goffe,[22] of New York, has been using a modified Sänger operation since early in 1902 and has published two papers upon the subject in which he describes his technique. It appears to be an amplification of former work by other operators. His theory of the bladder supports includes the uterovesical and vesicopubic and other ligaments, and he attaches great importance to their function. Dr. Goffe calls this "Nature's plan."

Operative Results. Several authors have reported their operative results, and while nearly all of this information is from foreign sources, it is because the method has not been

widely used in this country. Baatz[25] (Berlin, 1904) reports 38 cases in which retroversion associated with cystocele was treated by vaginofixation. After three years 36, or 94.7 per cent., were successful as to the position of the uterus, with 29, or 76.3 per cent., vaginal prolapse cures. Herr Baatz mentions 144 cases of prolapse and retroflexion treated since 1899, 75 of which showed no defects four years afterward. In 33 operations after Schauta's modification of the Wertheim "interposition" operation, only one case of uterine displacement had returned and one possible return of a bladder prolapse after an interval of from five months to two years after operation. (See discussion of paper of Baatz by Herr Fuchs, of Danzig, same journal.)

Theilhaber[26] obtains 92 per cent. of cures.

Baum,[27] in *Die operative Behandlung der Scheider und Gebärmutter Vorfälle,* says that slight prolapse gives 71 per cent. and the severe cases only 66.6 per cent. of absolute cures.

A. Martin[28] shows 82 per cent. and later 93.1 per cent. of cures in private work.

Sheib,[29] who has made some effort to ascertain the relative number of recurrences after the former methods used by gynecologists in operations for cystocele, says 21.4 per cent. showed a return in favorable cases, as in women under thirty years of age. In those over thirty and under fifty, 34.8 per cent. and over fifty, one-half, or 50 per cent. had relapses.

Cohn had 96 per cent.; Kauffmann had 42.2 per cent.; Hohl,[30] Olshäusen clinic, had 88.5 per cent., and Andersch, including all operations, had 92.6 per cent. of cures after antefixation in which the uterus remained in position, but the vaginal prolapses were not quite so satisfactory.

Andersch had 85.2 cures of vaginal prolapse; Hohl had 77 cures of vaginal prolapse.

Hohl (of the Frauenklinik, Halle) reports 60 cases cured,

occurring from 1894 to 1897, in which vaginofixation was done for associated retrodisplacements of the uterus and vaginal prolapse. The bladder decensus cases were all found in excellent condition.

Herff[31] (Halle), in *Ueber die Dauerresultate der Prolapsoperationen,* says he obtains 34 per cent. of absolute cures in the ordinary anterior and posterior colporrhaphy. In vaginofixation and vesicofixation he obtains 22.5 per cent. of absolute cures, but 73 per cent. of relative cures.*

Andersch[32] (Pfannenstiel, Breslau Klinik). Eighty-nine cases. Vaginofixations with plastic work upon the anterior and posterior vaginal wall, 71 cases. Of these 57 showed perfectly satisfactory results; 13 had a slight return; one was a failure. The ordinary plastic operations are reported as very satisfactory in this clinic, namely, anterior and posterior colporrhaphy with amputation of the portio, showing 11 out of 12 cases to have been cured.

Asch[34] reports 16 cases, showing 13 absolute cures in vaginofixation; 1 slight return; 2 bad results. He says the results of plastic and fixation methods combined show 80 per cent. of cures. His experience appears to favor a combination of Alexander operations with plastic work which gives him 92.45 per cent. of permanent results. Pfannenstiel[34] has had a large experience with an operation similar to that of Schauta. He reports (page 493) 268 cases showing 147 firm and 121 lightly fixed prolapses ("losen fixations"). All of these operations, however, are classed as good results.

Professor Martin, in his admirable and exhaustive paper read at the Würzburg Gynäk. Cong., in 1903, calls attention to the operative results in many of the European clinics

* This writer had seven deaths in 137 operations upon the pelvic organs in which plastic work was done, and we think there was a complication of operations and conditions which should not be considered as properly belonging to the statistics of uterine and bladder displacements.

besides his own, which would lead us to infer that his use of the Sänger or flap-splitting method is reserved for a comparatively small number of cases. It is, however, apparently clear that he obtains most excellent results from his private work, or at least 93 per cent. of cures.

COMMENT.

The Sänger flap-splitting technique is incomparably the operation of choice in a vast majority of instances. It is simple and effective in cystoceles of moderate size, and especially when the uterus is in fairly good position. The bladder is widely separated from the vaginal wall, but not from the uterus.

Drs. C. P. Noble,[24] Gilliam,[23] and Goffe[22] have adopted nearly the same technique, and the writer in his 1902 paper has also reported his experience with a modification of the operation.

The operation of Arx is adapted to the severer forms of prolapse of both uterus and bladder.

The method of Gersuny, while ingenious and a great improvement upon the old anterior colporrhaphy, fails to meet with our full approval, because it turns an irregular ridge into the base of the bladder which our operation avoids, and it also fails to reattach the bladder higher up and farther out toward the pelvic wall. On the contrary, the infolding of his purse-string sutures leaves the lateral margins of the bladder attachments just as before. The choice between the methods of "interposition" appears to us a matter of individual preference. Personally, we approve of the Schauta technique, unless we can use the modification by ventrofixation — uteromuscular approximation. (Scarified fundus to exposed recti with cuff of peritoneum.) Dührssen, Mackenrodt, Steinbüchel, and Lott[33] have each left very

little to be desired when cases of extreme prolapse of the uterus are associated with cystocele. The methods of Freund, Fritsch, and Wertheim do not appeal to us, for we have always succeeded in curing our patients without leaving their uteri in their vaginæ.

The method proposed by Alexandroff and those who use the base of the broad ligaments as tractors or suspensors, has not been in use sufficiently long to fully test its merits.

Finally we reserve the Sänger technique for a class of cases which are most difficult of cure by any of the usual methods by vaginal narrowing or by any operation upon the ligaments of the uterus. We speak of those cases seen in old women having thin vaginal walls with large cystoceles and atrophic uteri. It is here that Hadra may have seen what he thought was a separation of the bladder from the cervix, for when the cervix is atrophied there is indeed very little of what may be called a "portio." Our operation has been repeatedly tried in these cases with far better results than has been attained by any other method. We will be confronted occasionally by such cases occurring in frail women who should not be subjected to an abdominal operation of any kind. In fact, there is nothing but plastic work to be considered, and our only resource is to apply the method which will give good results and not overtax the patient. Fortunately, many of these senile patients are no longer obliged to submit to sexual intercourse, and this enables us to supplement the elevation of the bladder by extreme narrowing of the posterior vaginal wall. We have not heard of nor seen a return of the cystocele after a completed operation by this method, and we have every reason to believe that bladder elevation will grow in favor until all other methods are supplanted by it.

The evolution of the flap-splitting cystocele operation is shown by papers named below, which are given in nearly the order of their publication. After Lawson Tait and

Simpson, we find that Sanger used the name and applied the method to the treatment of cystocele and rectocele.

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DISCUSSION.

Dr. J. Pfannenstiel.—In the treatment of prolapse of the uterus and bladder, the most important point is the cystocele. The best way to prevent the recurrence of a cystocele is, in my opinion, the vaginal interposition of the uterus between the bladder and the vagina. Neither ventrofixation nor any method of shortening the round ligaments gives good lasting results, because the relaxed pelvic floor cannot hold the bladder in the normal position. On the contrary, the bladder is pushed downward by a ventral or inguinal fastening of the uterus so strongly that the best methods of colporrhaphy will not be sufficient to hold it up. With the recurrence of the cystocele begins the return of prolapse and retroflexion. The only measure that can help here is the interposition of the uterus between the vagina and the bladder; that is, a vaginal operation consisting in a combination of very extensive vaginofixation with corre-

sponding anterior and posterior colporrhaphy and perineoplasty. For this purpose I lay stress upon a complete separation of the bladder from the cervix and vagina, not only in the middle but also laterally in order to be able to push it upward as far as possible. Furthermore, the uterus should be sewed to the vagina, not at the fundus but in the upper third of the anterior surface of the corpus. The elliptical flap cut out of the anterior vaginal wall should not be too broad, and the vagina slightly undermined on both sides in order to make ample room for the interposition of the uterus. While the vagina is sewed up the cervix is pushed back into the posterior fornix, since if drawn before the vulva in this step of the operation later it will not readily return into its proper position high up. Interrupted sutures are employed; the last one tied is used as tenaculum. A corresponding colpoperineorrhaphy completes the operation by providing for the descended uterus a new firm support. This operation can be performed also on a woman still within the childbearing age, without any danger of causing a dystocia. Then, however, the following modification has to be made: It is necessary to interpose the peritoneum of the bladder as we have been taught by Dührssen. The permanent results of this modification, however, are not entirely satisfactory. Recurrence is possible. Therefore, I prefer the method of direct fastening of the uterus to the wound surface of the undermined vagina.

Dr. J. Riddle Goffe.—I have not followed the literature of this subject very carefully, consequently I did not know just what had been done or what had been proposed by the various writers referred to by Dr. Stone up to the time I perfected my operation for cystocele. I had never heard of Hadra until Dr. Noble last year pointed out at Atlantic City the work he had done.

I assumed the principle that the organs in the female pelvis, like the organs in every part of the body, are held by their ligaments. There is a great principle underlying the support of organs in the body; that is, they are suspended from above. The framework of the body is for that purpose, and as we examine the human body from top to bottom we find various organs are held to the framework by tissues which, acting as supports, we may call ligaments, although

they do not carry out the anatomical definition of ligaments. I maintain that this same principle is in vogue with regard to organs in the female pelvis, *i. e.*, suspension from above. There is a certain amount of support which comes from the floor of the pelvis, but that is of little account when the pelvic organs are in normal position. The idea, therefore, of building up supports below on which they may rest is contrary to Nature's plan of supporting organs, and, therefore, is not a permanent procedure. If we would follow Nature we must hang these organs from above, and working upon that principle in cases of rather limited cystocele, I have adopted the scheme of carrying the uterus high in the pelvis by shortening both the round and the uterosacral ligaments, and then hanging the bladder to the uterus and broad ligaments. The scheme of my operation is similar to that described by Dr. Pfannenstiel, but my dissections are much more extensive. I dissect the bladder absolutely free from all its surroundings from below, not alone in the median line or a little to one side, but clear out to the lateral walls of the pelvis, setting the bladder entirely free in every direction. It can then be carried up into any desired position and fastened there. In cases of rather limited cystocele, where the uterus is not very much prolapsed, I make anterior vaginal section, go through the peritoneum as reflected from the bladder on to the uterus into the peritoneal cavity; shorten the round ligaments, carrying the uterus high up; spread the bladder out on the anterior face of the uterus and broad ligaments with three sutures, one suture being inserted in the median line and one suture on either side. If we have a suture in the median line only we raise an anteroposterior ridge, and that makes a sulcus on either side for the accumulation and retention of urine, which is unfortunate. The principle is to hang the bladder to tissues that are above and support it there. The bladder will stay in place as long as the uterus does. To prevent the pull of a rectocele on the uterus, thus dragging it down, I reconstruct the floor of the pelvis in these cases, but I depend upon the attachments above as the principal support of the bladder.

In cases of procidentia uteri I think the turning down of the uterus and fastening it to the vagina underneath is

simply a temporary procedure; it is not going to last. When the uterus is turned down between the bladder and the vagina, unless the ligaments of the uterus are sufficiently short to hold it up, sooner or later the uterus, bladder, and all will come down. I have had such a case myself. I operated on a woman a year or more ago in whom I did this operation, which we know as the Wertheim-Watkins operation. I turned the fundus down underneath the bladder, allowed the bladder to ride over the top of it, and stitched the fundus to the vagina down as far as the urethra. Yet inside of six months both the vagina and uterus were outside of the body. In a second case, to overcome that unfortunate sequela, I first shortened the broad ligaments at their base, *i. e.*, the cardinal ligaments as well as the round ligaments, and even then the fundus came down to an unfortunate degree, so I excised the fundus and fastened the round ligament to the stump and stitched all to the vagina. But I am not satisfied with that. I have come to the conclusion that in all cases of prolapse of the uterus it is better to remove it, then shorten the broad ligaments with the round ligaments by cutting them away until they will just reach well across the pelvis from side to side and stitch the two together. Upon the anterior face of the ligaments thus arranged I spread out the base of the bladder and stitch it securely. In cases of extreme cystocele, since adopting that method, my results have been entirely satisfactory. It is not difficult to do and is a far different procedure in its immediate and remote results from turning the fundus down and making it carry the bladder on its back.

Dr. August Martin.—Since Dr. Stone has been kind enough to mention my work in connection with this subject, I am prepared to say a few words on this very interesting paper.

I have been working on this problem for more than thirty years, and it is interesting to me to note that formerly we depended largely upon the strength of the perineum. In my own way I added to the prolapse operation an operation on the cervix uteri. We began this work in 1878, and up to 1888 we worked to perfect the technique of the operation. We first operated on the vagina and then enlarged the field of operation, so that in the last twelve years much more

attention has been given to the bladder; and we have discovered that when we give better support to the bladder our results are much more likely to be successful. The support of the bladder has been tried in a variety of ways. Wertheim proposed to put the uterus down in the vagina and fasten it, but the uterus put in a pouch in the vagina was no means of retaining it. The operation which is done by Pfannenstiel and by Schauta of placing the uterus above the anterior wall and conserving the vagina is undoubtedly a progressive step in this direction. I have performed this operation several times, but cannot say that I have been completely satisfied with it, although it is without doubt a step in the right direction. I think the plan proposed by Pfannenstiel is similar to the operation described by Dr. Goffe for retaining the bladder. Then there is what is known as the Marks operation. When the bladder is partly freed, an operation is performed to correct the position of the uterus. We open the anterior pouch; we correct the position of the uterus, if the uterus is retroflexed; if there is any adhesion we break it down and finish the operation on the uterus and close the peritoneum in the usual way. In the bladder part of the operation the sutures are drawn together very much like the strings of a tobacco pouch, thus narrowing the base of the bladder. I have done this operation for Dr. Kelly in one instance. Then we see that the free extended surface of the base of the bladder is smaller and smaller, and at the end of the operation we have quite a small space left which should be covered by the vagina or the rest of the anterior vaginal wall. The attention paid to the bladder is a very important part of the whole operation. It is necessary in these cases to do a combination of operations in order to correct everything that is wrong with the pelvic floor. For instance, at the same sitting we should operate on the ovaries and tubes if diseased, on the perineum if it is lacerated, on the uterus if its position is wrong, and in the same way we should operate on the bladder and the rectum to correct cystocele and rectocele. It is necessary to pay attention to the other structures involved as well as to that for which the operation originally was intended. After all, one may have to fix the uterus to the abdominal walls. We must correct all the pathology, and we can hardly expect

good results unless we correct every disorder that is found in these cases.

The results of these operations are usually published a year or two after the operations have been done. These cases should be observed for six or seven years after operation before they are pronounced definitely cured, and if this is done I am sure we will find we have not as large a percentage of cures as we thought. In addition to these operations, undertaken with a view of removing pathological conditions, the general condition of patients should be given proper attention. Unless we give these women proper advice as to nourishment and the food they should eat, many of our operations, plastic and otherwise, may prove failures.

Dr. Charles P. Noble.—I think all of us have gone through a developmental process in dealing with cystocele. As I wrote in a paper which I read before the American Medical Association last year, the most we accomplish in the cystocele operation is a very free detachment of the bladder from the vagina and the uterus, so that later when the vagina is attached to the front of the cervix and to the uterus the bladder is free to become elevated in the pelvis. It seems to me this is an essential thing in cystocele operations.

So far as the permanent results are concerned we must only content ourselves by curing all the associated conditions as emphasized by Dr. Martin. That is to say, we must cure the retroposition of the uterus which is usually present as a part of the prolapse, and finally we must restore the pelvic floor. So far as the permanent cure is concerned it is my conviction, after careful study of this problem, that the restoration of the pelvic floor gives us our final and permanent results, and unless that is carefully restored, no matter what operation we do on the cystocele, it will not give us a permanent cure.

As to vaginal fixation, its dangers are well known in women who are pregnant or likely to become so, but in women who have passed the menopause it is not open to that objection, but I have preferred in these cases to do ventrofixation; for younger women in whom pregnancy is still possible I have used suspension of the uterus to correct the retrodisplacement rather than vaginal fixation. In some

of the minor cases of cystocele, where the uterus is not retroverted, it is quite sufficient to stitch the vagina, after freeing the bladder, to the anterior face of the cervix and uterus without opening the peritoneum. I have done this repeatedly, restoring the pelvic floor, with very satisfactory permanent results.

SECOND REPORT ON OPERATIONS FOR RELIEF OF PELVIC DISEASES OF INSANE WOMEN, INCLUDING 411 PATIENTS.

A STUDY OF THE CHARACTER OF OPERATIONS APPEARING TO GIVE THE BEST RESULTS; ALSO THE CHARACTER OF INSANITY RECEIVING THE GREATEST BENEFIT.

By LeRoy Broun, M.D.,
New York.

"Mere medical and moral treatment does not meet all the requirements of psychiatrical practice, and therefore we should leave no stone unturned in endeavoring to treat our cases individually according to their several needs."

Such are the words of Mabon, the former president of the New York State Lunacy Commission and now the medical superintendent of the Manhattan State Hospital.

In other words, each patient should be restored to the highest state of physical health in order that the special treatment directed to her mental state shall be productive of the greatest good.

It was in this spirit and with this desire that in 1902 I was placed in charge of the gynecological operations of the Manhattan State Hospital, an asylum having under its care some 2500 women and receiving yearly about 1000 new patients.

All patients on admission are given a systematic physical examination, including the condition of the abdominal and

pelvic organs, each feature of the examination being carried out by one trained in the special line.

When pelvic or abdominal pathological conditions are present, such patients are referred to me for the purpose of determining whether symptoms arise from such, and, if so, whether an operation will be of benefit.

The advisability of an operation having been decided on, the guardians of such patients are communicated with, the condition and physical benefits explained, and their approval of the operation considered advisable is asked. When refused, as not infrequently, nothing is done.

If will be seen that the physical condition and the possible relief from the resulting physical distress has alone been considered. The mental condition has not been taken into account, except in instances in which the psychical state precludes the advisability of any operative procedure. The patient, after she has recovered from the operation, is transferred from the hospital ward proper to the one in which she had been previously assigned; there the treatment directed to her mental state is again taken up.

A separate history has been kept of all patients operated on in order to determine if possible to what extent the relief from physical symptoms, together with the asylum treatment, has benefited their mental condition.

Since my connection with the hospital there have been done, by myself and under my supervision, 401 abdominal and pelvic operations.

What benefit, if any, have these operations been from a mental standpoint? Has the effect been in any way to hasten the patient's mental recovery? or has their mental condition shown a more rapid improvement after the operations than before them? With patients in whom, from the character of their psychosis, there is no possibility of a mental improvement, have they been made more contented with their surroundings and happier units of the colony of which they are

a part? These are the questions that are vital to us and which can only be answered by a study of the progress of many patients upon whom operations have been performed for the relief of physical suffering. A few isolated cases prove nothing. There are too many associated factors entering into the progress or lack of progress of a patient mentally deranged to argue from small numbers. To succeed in offsetting one set of extraneous conditions by others of an opposite character, a collective study of the results of many operations is necessary; by this means only can we with reasonable surety feel that we arrive at correct conclusions.

In 1895 I presented for your consideration a paper entitled "Operations for Relief of Pelvic Diseases of Insane Women," based on the surgical work performed on these unfortunates during the two years previous. The conclusions drawn at that time from a study of the effects of these operations were:

1. That in no instance was the mental disturbance of the patients accentuated by the operations performed.

2. That the physical benefit shown by those operated on was noticeable in a marked degree in almost 50 per cent. of the cases, and appreciable in about 40 per cent. As a result of this bodily improvement they became happier and more contented units of the colony among which they lived.

The mental recovery of twenty of those included in this preliminary report was unquestionably hastened by the operation performed upon them. While in most instances there had been some mental improvement before the operation, yet in all of the twenty the psychic improvement was striking after the surgical recovery, and in some instances the improvement seemed to date from the operation.

At the time of presenting the paper from which the above conclusions were drawn I did not feel justified in making further deductions other than that the apparent mental improvement, as a result of the operations, did not depend on the character of the operation done, but more upon the relief

from the train of symptoms attendant upon the pathological states for a cure of which an operation was demanded.

Three years have passed since the preliminary report of this work. The number of patients included in the present report is 411. This includes the total number operated on for the last five years.

Of this number, seventy-two patients have been discharged as recovered.

The mental recovery of thirty-two, or about 44 per cent., showed a much more rapid improvement after the operation than before. No patient is included in this number whose mental progress was not strikingly marked after the operation in comparison with her progress before the operation was done.

For the purpose of studying the character of surgical work done on those whose mental recovery was in a large measure due to the relief given, I have divided the operations into two classes: abdominal and plastic.

Among the abdominal operations occur twelve recoveries.

Three followed supravaginal hysterectomies for fibromyoma of the uterus, both adnexa being removed in each instance.

Seven followed suspension of the uterus, in two of which the adnexa of one side were removed. In one gastroplication was also done. In two small fibromyoma were also removed.

One followed removal of an ovarian cyst.

One followed Bassini's operation for inguinal hernia.

Among the plastic operations twenty recoveries occur, including operations for endometritis, for lacerated cervix and perineum, and for displaced uteri.

From the above it would appear that the mental benefit resulting could not be ascribed to any special class of surgical procedure. Among the abdominal operations, the largest number of those benefited were patients with adherent displaced uteri. In none of these were both adnexa removed. In two of these patients, one adnexa was removed.

Among the total number of abdominal sections it was necessary to remove both adnexa in thirty-seven patients. In only three of these was there any apparent marked mental improvement following the operation. This result is not in accord with the published results of some operators. These operators appear to attach considerable importance to diseased ovaries and their removal, even though slightly cystic, in order to attain the greatest good with their insane patients, the apparent idea being that a certain reflex irritation was set up by the presence of ovaries that were diseased even to so slight a state as cystic degeneration.

Such teaching is diametrically opposed to the accepted fact that the interests of the patient's nervous system are best conserved by preserving, when possible, even a part of an ovary; certainly not by sacrificing ovaries healthy or cystic. The monographs of Kelly, Doran, Burckhard, Andrews, Nicholson, and the exhaustive study of Peterson, as given in a recent paper, strongly emphasize the accepted importance of conserving the ovaries when possible to do so. The removal of these organs, when not destroyed by disease, can only result in the development of a train of symptoms directly opposed to a favorable outcome in the treatment of insane women.

Raimann, in 1903, in an excellent article, reports in full eleven cases in which the hallucinations were referable to the pelvic organs. These patients were selected from the local asylums and referred to Professor Schauta's clinic; they were chiefly cases of hystero-epilepsy, hysteria, and delusional insanity.

In all the adnexa were removed, though not necessarily diseased. In only three was there any improvement.

The results of my own work are more in accord with those reported by Manton, who for a quarter of a century has been connected with the East Michigan Hospital, and has probably done more than anyone else to educate asylum superintendents to the importance of relieving the physical distress of those under their care.

Picqué, of Paris, surgeon to the alien hospitals of the Department of the Seine, also, in the reports of his work, gives results in accord with those of my own. The largest number of patients benefited mentally were among those with whom some form of plastic operation was done, demanded by bad cervical tears, pelvic-floor lacerations and protrusions, and, when present, displaced uteri. Two-thirds, or twenty of those benefited, belonged to this group. The number of patients needing minor operations were, however, considerably in the majority of those on whom abdominal sections were performed.

It is a common occurrence for all of us to see a pleasing physical and nervous improvement follow the restoration of a badly torn cervix and perineum, or the return of a uterus to its forward position. It is but reasonable that the same relief of symptoms should follow the same operations on the insane and at times hasten the beneficial effect of the special treatment addressed to their mental state, provided the character of insanity is such as can be classed as recoverable.

CHARACTER OF MENTAL DISTURBANCE MOST BENEFITED.

Of the thirty-two patients whose mental recoveries were hastened by the operations, twenty-five, or 78 per cent., were in cases in which the insanity showed the dominating symptom of *depression*. In the old classification existing in the hospital prior to 1904, these were grouped under melancholia, acute and chronic, involution melancholia and depressive hallucinosis.

In the new classification now adopted the majority of such conditions are placed under one head, manic-depressive insanity, and others to the involution period of life. Five of the remainder, or 15 per cent., were patients in an excited or exalted mental state. The remaining two patients were cases of dementia precox and paranoiac symptoms.

IMPORTANCE OF EARLY OPERATIONS AND TREATMENT.

Fifty-eight per cent. of the number of patients who received hospital treatment and operations within six months after the commencement of their insanity were improved or recovered; 33 per cent. of those receiving treatment and operations within a year improved or recovered. These do not include those in the first class. Twenty-six per cent. of those receiving treatment and operations after the expiration of a year were improved or recovered.

The number of recoveries taking place among those with whom treatment was commenced within six months after the commencement of the mental disturbances was five times as great as among those upon whom treatment was commenced at a later date.

This fact, the importance of early treatment, is recognized by all alienists and is a prominent factor in the prognosis of the probable recovery of one coming under their care. The outlook for an amelioration or favorable termination of recoverable cases is greater when submitted to treatment before the psychosis becomes a fixed habit. After the expiration of a year the possibility of bettering the patient by any form of treatment rapidly diminishes.

Forty-four per cent. of the seventy-two who were discharged recovered had their improvement hastened by the operations performed. Why it is that some recover and others with a like mental disturbance, even under the most advanced treatment, fail to respond, can only be answered by citing a parallel with physical diseases. The ability to improve varies with each individual, whether mental or physical. Tomlinson, of St. Peter's Hospital, Minnesota, aptly expresses this varying response to the stimulus of treatment in the term "individual nervous potentiality."

The view at present accepted by most writers on insanity,

and by those in charge of large bodies of insane, is that pelvic and abdominal diseases in women act (by the distress attending them) as coincident or secondary causes in the production of insanity in women of an already weakened mentality.

Such conditions, however, only act in undermining by a slow, continued process, the general health of the subject, eventually culminating in the complete break-down of the patient already predisposed. Again, such diseases can be the cause of a patient already insane becoming wildly maniacal or deeply depressed. As an example of such conditions I cite two cases:

Miss D. McL., aged thirty-four years, single, was admitted to the hospital May 14, 1903, in a greatly excited state, almost constantly screaming and crying out. She had been insane for three years, the mental diagnosis being delusional insanity. When I saw the patient two days following her admission the abdomen was tense and distended, and little could be made out except a rigidity of the muscles of the right side. The leukocyte count was 23,000. An operation was immediately done, and an appendicular abscess was evacuated and drained. All hallucinations disappeared after the operation, and she was discharged five months later apparently recovered. This patient was readmitted a year later with hallucinations, though of a milder character.

Miss C. S., admitted to the hospital December 23, 1902, with a diagnosis of dementia precox. The depressive type of her insanity was very marked. The patient would not answer when spoken to, nor would she speak to anyone. When first seen by myself, two years after admission, she refused to eat, necessitating tube feeding. The emaciation was marked. The pelvic condition was the exudative remains of an old perimetritic abscess ineffectually draining itself through a vaginal sinus. Cultures gave an almost pure streptococcus.

A panhysterectomy was done. During the surgical re-

covery of this patient the rapid change in her mental state was most pleasing. She not only answered questions intelligently, but would speak to members of the staff, calling them by name. From one deeply depressed, she became light-hearted, and showed a lively interest in all her surroundings. She was discharged in the hope that she could continue without asylum treatment. Family differences precipitated an acute exacerbation, necessitating her return to the hospital. A large ventral hernia, resulting from drainage in the first operation, was repaired. A few months later, her mental condition being so mild, she was discharged in a condition to assume some of the duties of life. She has not returned to the hospital at this writing.

The above cases are examples of septic intoxication coming on after the establishment of a psychosis and greatly accentuating the mental disturbance. The surgical relief was of benefit in relieving acute mental exacerbation.

As an example of acute mania following an operation for a pelvic abscess and resulting in recovery after a cure of the sepsis, I cite the following: Mrs. R. H., aged twenty-two years, married, entered Roosevelt Hospital for a tubo-ovarian abscess. This was incised and drained by the vagina. Shortly after the operation the patient became acutely maniacal. Upon admission to the State Hospital, November 14, 1904, there was an extensive exudation in the pelvis, with abscess of the other tube and ovary. Under repeated incision and drainage, the exudate cleared up. The patient was actively maniacal throughout her surgical treatment. After the pelvic exudate had disappeared she slowly improved, and was discharged, recovered, May 8, 1905, five months after admission. She has remained in sound mental condition.

Insanity following operations is fortunately rare; yet there are few of us, with average surgical experience, who have not had some such occurrence.

In the large majority of cases it is due to a septic intoxica-

tion, as in the above instance. The Manhattan State Hospital, receiving the insane of New York City, is the recipient of all such cases occurring in the general hospitals. They are fortunately few, and in every instance since my connection with the institution such conditions have followed sepsis. Rohé, in a communication with all the insane hospitals of the United States and Canada, states that in the ten years prior to 1903 only twenty-five patients had been registered as having become insane following gynecological operations. Martin states that no woman, unless of a marked neuropathic state and hereditary predisposition to insanity, can become insane as a result of an operation. Picqué, whose large experience with the aliens of Paris, entitles him to speak from experience, states that the large percentage of such conditions follows sepsis and occurs in alcoholics; when insanity does occur under conditions other than the above, he states that in his experience it is with those who are weak minded and who have an abnormal fear of operations. The number of cases reported by Thomas, Edwards, Gray, and others of twenty years ago was when surgical asepsis was not what it is today.

In the light of modern knowledge, insanity following surgical operations is rare. The character of the operation is not a factor, such occurrences being as likely to follow a trivial general surgical procedure as one of a graver nature. The determining cause is a neuropathic state, associated with an hereditary predisposition and an exaggerated fear of the operation.

Among the patients whose recoveries were hastened by operations the following cases will serve as examples:

Mrs. T. M., aged thirty years, married, was admitted to the hospital November 19, 1902. The mental condition was one of acute mania. The pelvic examination revealed a bad laceration of the cervix and perineum, with an endometritis. The conditions were repaired March 5, 1903. *Four months* prior to the operation the patient showed no mental improvement

under the regular hospital treatment. After the operation she made rapid improvement under the same treatment and was discharged, recovered, June 20, 1903, two and one-half months after operation.

Mrs. H. L., aged twenty-one years, married, was admitted to the hospital February 23, 1903, with a history of having been insane for two days. Her general physical condition was poor. The mental diagnosis was melancholia acuta. The pelvic condition was a retroverted adherent uterus with adnexal disease. The patient did not respond to the hospital treatment, showing no mental improvement after *five months.* August 4, 1903, the adhesions were severed and an intra-abdominal shortening of the round ligaments was done, also the right ovary and tube were removed. The patient made a rapid physical and mental improvement and was discharged September 4, 1903, one month after operation. It would appear in this instance as if the depressed state was directly due to the pelvic condition, on account of the rapid mental restoration and the failure of the patient to respond before the relief of the pelvic condition.

The following is an example of the benefit of an operation not gynecological:

Mrs. H. W., aged forty-three years, married, was admitted to the hospital August 24, 1901, with a history of having been insane for one month. The mental diagnosis was melancholia acuta. When seen a year after entrance she had a large right inguinal hernia. Bassini's operation was done November 20, 1902, *fifteen months* after admission. During this interval of fifteen months her hallucinations had been persistent. Four months after the operation all hallucinations had disappeared and the patient was discharged, recovered.

There are other examples among those whose mental recovery was hastened by the operation and in which the beneficial effect of surgery was as striking as with those

patients above cited, and others in which the improvement was more gradual. A further narration of these cases will, however, unnecessarily lengthen this article.

The large percentage of those benefited belonged, as stated, to the manic-depressive group, a recoverable class susceptible to the benefit of all forms of physical improvement. It is possible that all of these patients might have recovered independent of the operation; it is, however, none the less true that their recovery was hastened by the operations. We may attribute this to the moral effect or the physical improvement. The results, however, remain the same. I personally consider the physical benefit of the greater influence, and am not inclined to attach much importance to the moral side. One characteristic of this group of insanity is the proneness to recurrence after having recovered from one attack. While alienists state that this is especially true of this group, it is also true of other forms, though probably not to such an extent. There has been no return to the hospital of any of the patients included in this article other than those mentioned.

A striking feature of pelvic and abdominal conditions among the insane is the almost uniform denial of any resulting symptoms on the part of the patient. When questioned she will, in the majority of instances, stoutly deny that there is anything wrong or that she has any pain or distress.

As gynecologists, we must depend on our knowledge of such conditions and not give too much weight to the denials of the patient.

The presentation of this subject would be incomplete without a discussion of the character of insanity likely to be benefited through the indirect agency of surgical measures. As I am not trained in this line, I can only state the abstract results obtained as an operator, and as such have laid them before you.

In order to present to you what forms of insanity are most likely to be benefited, I have requested my friend, Dr.

Mabon, the medical superintendent of the Manhattan State Hospital, to give me an expression of his opinion upon this subject. He has kindly done so in the following:

"Replying to your letter of the 20th ultimo, I beg to say that the following diagnoses were made in the seventy-two[1] cases in which it is thought that recovery was hastened or assisted by operative treatment:

Mania acute	11
Melancholia acute	21
Melancholia chronic	8
Manic-depressive and allied	7
Mania recurrent	1
Puerperal mania	1
Delusional mania	2
Alcoholic psychoses	6
Infective exhaustive psychoses	2
Depressive hallucinoses	5
Depressions not differentiated	3
Dementia precox	3
Primary dementia	2

"The terms used above represent the old and the new forms of classification, the older forms being used on account of patients having been at the institution before the new forms came into general use, and all cases designated as 'mania' or 'melancholia' can be placed in the manic-depressive group, which aggregates fifty-one, or about 70 per cent.

"Six cases, or 8 per cent., belong to the alcoholic psychoses, while it is astonishing to us that only two cases, 2.7 per cent., have been drawn from the infective exhaustive group.

"The depressive hallucinoses furnished five cases, or about 7 per cent.

"You ask in what form of insanity the surgeon may benefit the patients. I think alienists would consider, in the first

[1] Dr. Mabon includes here all the cases recovered or improved by the surgical operations. In my own I selected from this those recovered, which were thirty-two.

place, that small group of disorders in which operation aims to reach directly the exciting cause, namely, the psychoses with operable brain tumors, traumatic lesions of the skull, acute hallucinoses with middle-ear or mastoid disease, the deliria in connection with local infections, and, perhaps, some of the psychoses accompanying thyroidism.

"*Owing to the evident complexity of the etiology which exists, even in the best circumscribed symptomatic group, it is clear that in the general estimation of the value of surgical interference it must be regarded as a procedure ranking with our other therapeutic measures which aim to get the patient as quickly as possible into a condition of bodily comfort and physical vigor.*

"*Manic-depressive insanity is regarded rather as a disorder arising on a constitutional basis and expressing itself in one or more attacks liable to be elicited by a great variety of causes, among which states of physical ill health are very important. In cases where the surgeon can relieve the condition which is wearing on the patient, causing worry, pain, or loss of sleep, good results may be expected to follow, and sometimes recurrence of attacks prevented.*" (Italics by writer of paper.)

In the alcoholic group, the psychoses often develop in connection with some physical disease, especially infectious disorders, and a special mention has been made by Kraepelin, Mott, and others of infections in the genital tract, particularly in women, as an important element in causing the outbreak and continuance of the psychosis.

"*In the infective exhaustive group good results can be expected wherever foci of infection can be attacked and removed, or where any exhausting influence can be checked.* (Italics by writer of paper.)

"In the large group of dementia precox, little in the way of permanent improvement can be expected, as it is here probably that certain deeply rooted inherent traits are working with various mental causes to bring about a gradual disintegration of the personality.

"I have tried in this to be as brief as possible, and beg to say that in the analyses of these cases I have been assisted by Dr. Hutchinson and Dr. George H. Kirby. The views as expressed represent pretty generally the opinion of alienists."

Dr. Mabon's opinion as an alienist coincides with the facts brought out in this series of cases, namely, that aside from the small group of traumatic insanity with which as specialists we are not likely to be concerned, it is reasonable to expect that a beneficial mental result will follow surgical operations upon patients with the manic-depression form of insanity, in so far as the operation improves the physical health of the patient. The same improvement can also be expected in exhaustive psychosis, either as the result of hemorrhage or sepsis. We know definitely that such operations, when they do not involve an unnecessary castration, cannot accentuate in any manner the mental state of the patient.

With this knowledge, how important it at once becomes that any woman on becoming insane should be given a thorough physical examination and that all pathological conditions should be rectified at once in order to restore to her, at the earliest possible moment, a full quota of bodily health, that further treatment can be effective, knowing that the possibility of a recovery diminishes rapidly in the direct ratio of the length of time of the existence of the alienation.

If the combined efforts of the alienist and the surgeon should fail, they still have the satisfaction of knowing that the unfortunate patient has been placed in a condition free from bodily discomfort and that we have given to her the same privilege granted when needed to the sister who has been more fortunate.

DISCUSSION.

Dr. Walter P. Manton.—I desire to say a word or two in regard to Dr. Broun's paper, as I have been much interested in what he has presented.

Something over forty years ago Dr. Storer, of Boston, succeeded in getting a committee appointed by the American Medical Association to investigate gynecological conditions in insane women, but this was opposed by all asylum men and nothing came of it. More than twenty years ago I began this special work, and was the first to take up systematic work among the insane. I read a number of papers, some before asylum superintendents, and at first met with opposition, but gradually, as the result of continued agitation, the superintendents of these institutions began to wake up and to interest themselves. From institutions reports were received from all over the country. I believe there is hardly any institution in the United States today which has not a gynecologist or a member of the staff appointed for gynecological work. This has always been a favorite subject with the profession, and the general practitioner is always active in securing results by operative measures.

I pointed out years ago that insanity was not to be cured by operation per se; that the results obtained were not from operations alone, but from the general asylum treatment, and that operation was only one factor in removing the source of irritation which gave a better chance for promotion of the mental cure.

Dr. Broun has cited several interesting cases. There is one point I would like to make because some of our Canadian confrères have published a considerable number of cases cured by operative measures. The point is that many cases are apparently cured soon after operation, but the majority of these cases sooner or later relapse. I had a rather interesting case quite recently in the Eastern Michigan Asylum of a woman, aged twenty-three years, who had obsessions during her menstrual periods. She had suffered all her life from dysmenorrhea. There was a backward displacement of the uterus and an ovarian cyst on the left side. She was operated on, and immediately following the

operation, as in the cases cited by Dr. Broun, the patient regained her mentality and remained well for several months. Her next menstrual periods were free from pain. She was so well that the authorities let her go home. The family, who lived in the country, were housecleaning at the time, and the girl feeling perfectly well entered into the spirit of the game, overworked herself, with the result that she again broke down and was returned to the hospital in a worse condition than when she first entered it. Now, had that girl been kept in the hospital for a number of months longer, I believe, although she had a bad heredity and was neurotic, she might have been entirely cured of her condition. As it is she is improving rapidly, and under proper conditions will probably ultimately be cured, and if she is kept in a proper environment she may remain cured. In asylums we see many cases very similar to this where operation has not been undertaken. I recall the case of a servant girl who became insane as the result of chronic constipation or auto-intoxication. She was apparently cured, and started to go home from the institution. Before she reached the asylum gate, a half-mile, she again broke down and has been mentally sick ever since. It was found afterward that she had become constipated, and had not been relieved of that condition.

Dr. Robert L. Dickinson.—There is one subject that was not touched on in Dr. Broun's paper, and that is the treatment of bad cases of nymphomania by ovariotomy. I have operated on three such cases successfully. I believe the reason for lack of success in previous operations has been that the operations have not been radical enough. Some fragment of ovarian tissue has been left behind, or nerve plexuses and ganglia in broad ligaments or cervix have kept up the local irritation, when there has been failure to extirpate uterus, tubes, ovaries, and most of the broad ligament. In one two years have elapsed since the performance of the operation, in another five, and in a third seven, which goes to show that the previous failures were probably due to lack of thoroughness. A fourth is too recent for report. Old adhesions bound down one ovary, so that I may have failed of total removal.

INTRAPELVIC (SUBPUBIC) *VERSUS* ABDOMINAL METHOD OF DEALING WITH MECHANICAL OBSTRUCTION TO DELIVERY IN CASES OF CONFINEMENT.

By Richard C. Norris, M.D.,
Philadelphia.

The important teaching of the modern results of the surgery of obstetrics is that of every surgical triumph, namely, an early elective operation performed by an expert surgeon with proper environment on a patient with good resistance. The pregnant uterus is not an exception to this rule. With this fact in mind it seems appropriate at the outset of the discussion before us to sharply draw anew the indications for the absolute indication of Cesarean section for mechanically obstructed labor. While it is true that pelvic measurements alone cannot wholly suffice for this study, and it is equally true that uterine energy, the shape as well as the size of the pelvis, the size of the fetal head, the condition of the cervix and of the pelvic floor, are all factors to be studied and to influence our judgment, it is also true that, from the viewpoint of the *absolute indication*, no one factor is more important and none can be ascertained with so great a degree of scientific accuracy as the direct measurement of the true conjugate of the pelvic inlet. The measurement of this diameter progressively loses its importance in studying the pelves that may be grouped among the relative indication,

but for the absolute indication is it not time, in view of the modern results of Cesarean section, to formulate a general rule, to which there will be few exceptions, that when the conjugata vera is less than 7.5 cm. in the simple flat and 8 cm. in the generally contracted pelvis, Cesarean section at or before the onset of labor should be the elective operation? The merits of pubiotomy as an alternative operation are to be determined by future observation and study.

This, then, is the first proposition I would offer for your discussion. Can the conjugate vera alone, and shall a measurement of 7.5 to 8 cm. or less, determine the absolute indication for elective section? Careful study of labor obstructed by pelvic deformity has brought me to the conviction that only exceptional circumstances would induce me to employ any other elective treatment for that degree of pelvic obstruction to labor.

That no other treatment is justifiable implies the necessity for careful study of patients before the onset of labor.

In order to avoid confusion, we must bear in mind throughout our discussion today, that elective or predetermined treatment of obstructed labor shall constantly be contrasted with forced or necessary treatment due to unfavorable conditions and neglected opportunity. At the very outset, then, it is necessary to emphasize the demand of modern obstetrics that the successful management of primiparæ and of multiparæ with histories of difficult labors requires that they shall, prior to labor, receive skilled examinations and study. This proposition must be accepted by the profession as the first step in any advance that the obstetric leaders can offer. The only reasonable argument of those who would minimize preliminary study is that of the so-called "test of labor," which especially is to be applied to the minor degrees of obstruction that include the relative indication for Cesarean section. Reynolds' studies have demonstrated, as reliably as statistics can determine this question, the progressively

increasing mortality of the section after varying degrees of tested labor. On the other hand, the statistics of spontaneous labor occurring in the degrees of obstruction now under discussion, gathered from various sources, show an average of 70 per cent. of unassisted labors and a total infantile mortality of about 11 per cent. Statistical arguments are commonly fallacious, but in this instance they are sufficiently convincing to teach us three important facts:

First, that too frequent selection of the section for moderate obstruction is not justified. Second, that preliminary study is essential to differentiate, with ever-increasing precision, the cases that may safely be left to Nature, or be aided *at the appropriate time* by skilled subpubic assistance. Third, that a test labor, when permitted, shall be so conducted that this progressive mortality and morbidity after any operative interference shall by some means be reduced. My belief is that this mortality, which is greatest after the late section, is largely due to infrapubic sepsis, and its reduction will depend upon a rigid aseptic management of such labors and upon operative interference being resorted to before exhaustion of the patient, which usually can be prevented by early and complete dilatation of the cervix and vagina in order to shorten the duration of labor and to conserve the patient's strength and surgical resistance.

The obstetric expert recognizes as equally necessary and difficult the following study, four weeks before term and at intervals thereafter, of all primiparæ and of multiparæ with histories of difficult labors:

(*a*) The relative size of the fetal head to the pelvis.

(*b*) The size and shape of the pelvis, their relation to each other, and the modified effect of these relations upon the mechanism of labor.

(*c*) The condition of the soft parts comprising the lower birth canal as related to the probable duration and traumatism of labor.

(*d*) The character of the patient, *i. e.*, her probable uterine, nervous, and muscular energy. In other words, her personal equipment for the ordeal of labor.

This field of study is today the most important because the most difficult of all obstetric problems. Here lies opportunity for the formulation of new and the development of old ideas; for the constructive ability that can devise new instruments of precision and for the unprejudiced analysis of the world's work that we may improve our obstetric judgment as well as our operative skill.

(*a*) *The Relative Size of the Fetal Head to the Pelvis.* The methods of determining the relative size of the fetal head to the pelvis, unfortunately, are less accurate during pregnancy than during labor. At the examination made two to four weeks before term, the head in many primiparæ will be found deep in the pelvic cavity, showing no relative disproportion, and such cases require no further study from the viewpoint of pelvic obstruction. When the head is freely movable above the pelvic brim its relative size should be estimated. Perret has devised a special instrument for measuring directly through the abdominal wall the occipitofrontal diameter, and he estimates the biparietal diameter as 2 cm. less than that measurement. Stone uses an ordinary pelvimeter and subtracts 2 cm. from the occipitofrontal measurement when it is 11 cm. or less; 2.5 cm. when it is over 11 cm. I must confess that these methods have not proved sufficiently accurate in my trials of them to gain my confidence in their results. Pinard's table, made from measurements of a large number of fetal heads, shows the average biparietal diameter to be 8.25 cm. at the thirty-sixth week of gestation; 9 cm. at the fortieth week. This table can conveniently be carried in mind as a standard, but has value only when the duration of pregnancy is accurately known and the induction of labor is contemplated. These methods, however, have only a relative value, and for a final

test, most reliance must be placed on Müller's attempt at manual engagement of the head. To be of any real service the patient must be anesthetized, and while an assistant forcibly pushes the head against the pelvic inlet a combined examination studies the relative size of the head to the pelvis and estimates the probable degree of disproportion. During this test it is well to have the patient in the Walcher posture.

(*b*) *The Size and Shape of the Pelvis.* While the patient is anesthetized the thickness of the symphysis and the true conjugate are measured by means of the Skutch or Hirst pelvimeter. Then follows a study of the inclination of the pelvic bones (conjugatosymphyseal angle), of the prominence of the sacral promontory and of the straightness or exaggerated curve of the sacrum. The projection and curves of the lateral pelvic walls, the depth of the pelvis, the character of the cervix and pelvic floor are all noted in order to be informed of the general shape and size of the pelvis and of their influence on the mechanism of labor. Even to those who possess a practical knowledge of pelvic deformity and its varying effects upon the mechanism of labor, the examination just referred to will not give results mathematically exact. The degree of moulding, of adaption, and lateral inclination of the head that result from effective uterine energy are important factors even more difficult to estimate. As the problem stands today it amounts to prophesy, with its truth or falsity depending, not upon exact laws but upon the individual's skill, experience in this class of work, and his resultant judgment. How often these can go astray each of us well knows if we judge each other by our own standards. For example, I cannot agree with Fry that when the head, after a few hours of labor, cannot be made to engage by suprapubic pressure the patient being chloroformed, a Cesarean section is always justifiable; nor would I conclude, as does Reynolds, that section is indicated when a woman with moderate dis-

proportion has had one stillborn baby following a difficult subpubic instrumental labor. I would also take issue with Williams, who, after a careful study of moderate disproportion, declares that the induction of premature labor is never justifiable. These variations in obstetric judgment are referred to in order to emphasize the importance of a closer study of the question before us. Returning to the data obtained from the examination of the anesthetized patient, it is true that only one factor thus discovered is mathematically exact, and that is the measured true conjugate. Considered apart from associated changes in the shape, inclination, and general character of the pelvis, it cannot determine the potential obstruction in any given case. Considered with these changes it is our most reliable guide to the selection of appropriate treatment for individual cases. The external measurements of the pelvis have, in the past, been given too great prominence in the text-books as compared with internal examination and measurement. They have little value to indicate size, but serve a useful purpose to indicate changes in shape, and thus lead to a closer study of the pelvic deformity. When found abnormal they indicate the need of studying the irregularities in the patient's bony frame that can influence the direction, shape, depth, size, and the curvatures of the component parts of the true pelvis. Of the variations in shape that will influence the obstetric capacity of the pelvis and modify the mechanism of labor, my experience has led me to pay especial attention to the height of the sacral promontory, the height of the symphysis, the angle of inclination of the pelvic inlet, the angle of inclination of the symphysis, and the degree of curvature of the sacrum. It is unfortunate that all these important factors have not been reduced to precise calculations such as are known to the mechanical engineer in his problems of resistance. Deprive him of his carefully prepared tables and let him attempt his problems with only his senses of sight and touch

and personal experiences, and his errors would soon disqualify him. The mechanical problems of obstructed labor must be more definitely systematized before our conclusions in individual cases can be scientifically accurate. Until that has been done we can only rely on individual judgment with its inherent errors.

(*c*) *Examination of the Cervix and Vagina.* The preliminary examination of the soft parts of the lower birth canal, as related to obstructed labor, attempts to predict the amount of rigidity and the time and energy required to accomplish dilatation. Heretofore I do not doubt that no inconsiderable proportion of maternal mortality and morbidity and a share of infantile mortality are directly to be attributed to the prolonged first stage so characteristic of labor mechanically obstructed. The spent energy of the patient, the premature rupture of the bag of waters with prolapse of the funis, the prolonged pressure that lessens the resistance of the tissues against infection and predisposes the child to increased risk of intracranial lesions have not received sufficient recognition as important factors in so-called test labors. When the cervix is hypertrophied, elongated, and rigid, as in elderly primiparæ and in those not sexually active, and when dense cicatrices have followed a trachelorrhaphy in multiparæ—when, in a word, a slow and tedious first stage is expected that will surely exhaust the patient and render her unfit surgically, modern obstetrics offers abundant means to safely dilate the cervix and vagina and to escape a large part of that exhaustion and surgical unfitness.

(*d*) *The Uterine, Muscular, Metabolic, and Nervous Character of the Patient as Related to the Ordeal of Labor.* Close observation of a patient during her pregnancy to learn how well or poorly she stands the strains common to all pregnancies is valuable, to estimate her powers of endurance, and her nervous and muscular equipment for labor. Prediction can often be made that muscular and nervous energy

will be lacking, that the labor will require assistance, often from the very beginning; and when a labor mechanically obstructed is in store for such a patient, it may be taken for granted that the natural forces unaided will be inefficient. To what extent this ill-equipment for labor can determine the choice of treatment is debatable. That it should exclude a prolonged and unassisted test of labor is clear to my mind, and it is also clear that a definite plan of treatment should be selected and then carried out with no delay. Such patients are unfit for prolonged operative procedure, but that they will stand an abdominal operation better than a well-chosen subpubic operation is not in keeping with our surgical tenets of the comparative strain of abdominal and vaginal surgery. The practical bearing of this study of pregnancy is that the obstetrically ill-equipped require above all others accurate determination of the degree of mechanical obstruction, must not be permitted to endure prolonged labor, and whenever the estimated obstruction will permit the choice of subpubic delivery that route is safer for them, because surgically it is less a strain and, if the choice has been wise, it is less dangerous.

The Management of Minor Degrees of Mechanically Obstructed Labor. (*a*) Elective Cesarean section; forceps; version. The low mortality and morbidity of the elective section for the absolute indication has induced some operators to widely extend the section for the relative indication, arguing that if safest for the absolute it will also be safest for the relative indication in the large majority of cases, since it at once eliminates the dangers incident to the test of labor. If the "test of labor" shall be that commonly relied upon in the past, then I am heartily in accord with that postulate. It is my earnest conviction, however, that modern obstetrics has something better to offer than a test of labor to the degree of exhaustion and infection of the patient. The high mortality of the late section is said to be largely caused by

the length of labor endured. More important than the mere length of labor is a closer investigation of the fatal cases to determine the frequency and technique of examinations, the degree of exhaustion induced by a prolonged first stage that can by newer methods be avoided, the violence and duration of unsuccessful intrapelvic efforts undertaken without careful study to assure their probable success or failure. In short, if such a critical analysis of many fatal cases be made, I believe the high mortality rate of late section would be apparent in sepsis and not intrinsically due to the mere length of labor endured. The field for Cesarean section for the relative indications contains the border-line cases (roughly speaking, those nearer to 8 cm. from the standpoint of the pelvis and a primipara with an estimated large infant), in which the section should be undertaken only after a test of labor has been conducted in the most approved manner. For this test, at the beginning of labor the patient should be prepared for both abdominal and subpubic surgery. If a primipara or highly nervous multipara, she is for a short period given an anesthetic and prepared for dilatation of the cervix.

With an aseptic technique, instrumental dilatation of the cervix to the extent of 8 cm., which is free from danger of laceration, followed at once by the insertion of Pomeroy's bag and its progressive but relatively slow distention, will so shorten the first stage of labor and dilate the vagina that the patient, with no expense of energy, is almost at once brought to the second stage, for which stage her energy is most needed. When the cervix is very rigid and a longer period is required for the bag dilatation, morphine can be employed to allay suffering and with inconsequent delay since the bag's efficiency is not thereby reduced. Active contractions usually will at once appear, and after the spontaneous extrusion of the bag, if the pains continue, labor is allowed to progress for an hour or two. In the absence of uterine contractions

or after their occurrence for an hour or two, the patient is again anesthetized, carefully examined and the further management having been decided it is at once undertaken. This management of the first stage of labor adds to the safety of a test labor. It shortens its duration, reserves the patient's strength, preserves the vital resistance of the woman's tissues, and the complete dilatation materially aids a further and more accurate study of the relative proportion between head and pelvis. Under the driving force of the awakened uterine contractions, the mechanism of labor in a flattened pelvis begins, and, as a result of the lateral inclination of the head, the sagittal suture lying in the transverse diameter of the pelvis gradually approaches the sacral promontory, and the distance of this diameter from the promontory is a fair index of the disproportion; when less frequently, the posterior parietal bone first enters the pelvic inlet; the distance between the suture and the symphysis is the index. When the distance between the sagittal suture and promontory has been less than 2 cm., I have never delivered a living child by forceps. In my last sixty high-forceps deliveries for mechanical obstacle there has been no maternal mortality, with nine infants' deaths—a mortality of 15 per cent. After the occurrence of strong expulsive pains the study of the relation between the promontory and sagittal suture determines for me the choice or abandonment of axis traction forceps. The Trendelenburg-Walcher posture should always be used for forceps deliveries until the head has been drawn to the pelvic floor. Version may sometimes save an infant so placed, especially if the pelvis is not generally contracted and the conjugate approaches 9 cm.; but with statistics showing an average infant mortality of 20 to 40 per cent., its danger to the child usually warrants the resort to more modern treatment.

It will be noted that up to this point the patient has not been permitted to be exhausted by a long and inefficient

first stage, and our technique has aimed to prevent infection. The further management, when spontaneous delivery is improbable and forceps has been barred, must be either section or pubiotomy, according to the operator's personal choice and experience, and the choice having been made the selected operation should immediately be performed.

If forceps has been persisted in and our judgment in its selection having gone astray, the infant's life is in serious jeopardy, as shown by heart sounds or cranial injury, craniotomy is the only alternative. The mortality of late section and of late pubiotomy—at least 12 per cent.—is too great to risk the patient's life for a dead or dying infant. Better extricate the woman from her dangerous condition by destruction of the child and, acknowledging our mistaken judgment, retrieve our mistake by securing for her a living child at her next confinement. The important point is to be reasonably sure of forceps before attempting extraction. As in gynecology, the relation between doubt and drainage has been settled in most men's minds, so here, when in doubt, do not use the forceps, but proceed at once to the section of the abdomen or pubis.

Pubiotomy and Symphyseotomy. Recent reports indicate that pubiotomy is steadily replacing symphyseotomy whenever both operations have been practised. In America neither operation has gained many supporters. In Germany, where pubiotomy has flourished of late, it appears that symphyseotomy has at least double the mortality rate of pubiotomy. Döderlein (*Zentralblatt f. Gynäkologie*, Nr. 24) reported 217 cases of pubiotomy, with 4 per cent. mortality, all the patients that died from infection having shown fever at the time of operation, and among the gravely infected cases the mortality was 12.5 per cent. Of the 133 aseptic cases collected by Montgomery (*Amer. Jour. Obst.*, December, 1906) there was no maternal mortality and no ill-effects upon the patients' subsequent gait or health. There seems to be

Case I

a tendency in America to reserve for the elective Cesarean section the lion's share of aseptic cases and to relegate pubiotomy to a "last-resort" operation, giving it an alternate place with craniotomy. A study of its literature shows clearly that as a late operation it is about as dangerous as the late Cesarean section, and as an early operation it has an equally low or lower mortality. My personal experience is limited to two cases whose detailed reports are herein given, the results in both instances being perfect for both mother and child.

Case I.—Mrs. E. (Case No. 6018), aged twenty-six years, a multipara, lost her first child during a difficult forceps extraction. In her second labor forceps had been tried unsuccessfully by her attendant, Dr. Lambert Ott, who called me in consultation. An examination (the hand in utero) determined that the child had perished and I delivered her by craniotomy that required crushing of the base of the skull.

Her pelvic measurements were as follows: Interspinous, 25 cm.; intercristal, 27 cm.; external conjugate, 16.5 cm.; conjugate vera, 8 cm. After delivery her weight was ninety-five pounds; her height was four feet and nine inches. Her third labor at term occurred at the Preston Retreat, where she had been admitted several days prior thereto. After four hours of active labor pains, with the bag of waters broken, the head was freely movable above the pelvic brim, the occiput lying to the left. A longitudinal incision above and to the inner side of the left spine of the pubis was made through the sheath of the rectus, only large enough to admit the tip of the index finger, which located the upper border of the pubic bone just inside the pubic spine. The periosteum was nicked, and the point of the Döderlein needle inserted. A metal catheter placed in the bladder was forcibly drawn to the opposite side by an assistant and the index and middle fingers of the left hand were then passed into the vagina to further push the base of the bladder to one side and the

head upward, and having located the tip of the Döderlein needle, guided its point as it was made to hug the posterior surface of the pubic bone, and escaping the margin of the obturator foramen, by a sharp turn of the handle the needle finally swept under the pubic arch ready to emerge through the soft tissues of the labium. The left labium was then strongly dragged toward the median line, and the needle thus was ready to puncture the skin at a point well removed from injury to the labial veins and from contamination with lochial discharge. The Gigli wire saw was drawn into place as the needle was removed. Before beginning sawing, the fingers of the left hand were again placed in the vagina to secure a correct line along which to sever the bone. This line passes just within the pubic spine and avoids the margin of the obturator foramen.

Traction upon the handles of the saw held the latter firmly in this line until a few strokes of the saw were carefully made to insure accurate section of the bone along this line. When the bone had been completely severed there was free oozing from the upper opening probably from the cut bone, but none from the lower puncture. The bleeding was at once permanently controlled by a small gauze pack placed in the wound and between the separated ends of the bone. The ends were separated a finger's breadth as soon as the section of the bone was complete. The cervix being completely dilated and the vagina relaxed, axis traction forceps brought the head into the pelvis care being exercised not to put sudden strain on the bladder and vaginal attachments. During the traction the ends of the severed bone separated three fingers' breadth, two assistants meanwhile making counterpressure upon the trochanters. A living child weighing seven pounds and fourteen ounces was quickly delivered. The gauze pack was then removed from the upper incision; there was no bleeding; the two small skin incisions were closed each with one silkworm-gut stitch, the upper including the split fascia of the rectus.

Case II

A wide adhesive strip was applied around the pelvis and the patient placed upon a Bradford canvas frame for her comfort and the convenience of her care during the puerperal period.

The convalescence of mother and child was normal in every respect, the temperature and pulse never rising above the normal. On the twenty-sixth day an examination failed, much to my surprise, to find a trace of callus. The incised bone was in perfect apposition and united, whether by bony or fibrous union I do not know. The patient left the bed on that day, walked without discomfort, and returned to her home on the thirty-first day.

Case II.—Mrs. G. (Case No. 6258), a primipara, aged twenty-two years. Menstruated April 9 to 12, 1907. Pelvic measurements: Interspinous, 26 cm.; intercristal, 28 cm.; external conjugate, 18.75 cm.; true conjugate, 9 cm. Face presentation, R. M. A.

Labor began January 10, 1908. Feeble pains throughout the day. At midnight, cervix size of silver dollar; inefficient pains, no engagement, patient beginning to be exhausted. Under ether, manual dilatation of cervix, followed by attempt to flex head and apply tentative forceps. Head estimated as of average size. Impossible to maintain flexion and apply forceps to L. O. P. Forceps then applied to persistent face presentation. Tentative traction showed grave mechanical obstruction and probable destruction of infant. At 4.15 A.M., pubiotomy (Döderlein technique); saw applied to left pubic bone as in Case I. No bleeding from either skin incision. Separation at once admitted one finger. During traction separation to two and a half fingers. One silkworm-gut suture in each incision. No drainage. One stitch in small laceration of perineum. Attempts to apply forceps to flexed head failed, and face presentation delivered with forceps. Infant slightly asphyxiated, revived in hot bath. Weight, five pounds, nine ounces. Convalescence of mother and infant afebrile.

TABLE A.—HOSPITAL CASES: INDUCTION

	Age.	Gravida.	History of previous labors.	Variety of pelvis.	True conjugate. cm.	Presentation and position.	Last catamenia.	Confinement expected.
1. Mary N.	32	VIII	Five living children. Two stillborn. All labors difficult. Delivered Oct. 26, 1893, at term: high forceps. Infant 7 pounds.	Flat rachitic	8.50	L. O. A.	May 28, 1894	Feb. 4, 1895
2. Annie D.	20	I	.....	Flat rachitic	8.75	Breech	June 12, 1895	Mar. 19, 1896
3. Annie D.	21	II	First labor induced at Retreat (see above, Case No. 2).	Flat rachitic	8.75	L. O. A.	July 26, 1896	May 2, 1897
4. Elizabeth A.	23	II	First labor: Infant 6 lbs., 10 oz.; stillborn; delivery spontaneous at term. Bitemporal 8; biparietal 9½ cm.	Flat	8.50	R. O. A.	Nov. 12, 1896	Aug. 19, 1897
5. Catherine McL.	35	IV	First pregnancy; 3 days in labor at term; infant dead; spoon-shaped depression in parietal bone. Second pregnancy; miscarried at third month. Third pregnancy; symphyseotomy at Retreat ten days after term; infant lived one year and died of croup.	Flat rachitic	8.00	L. O. A.	Jan. 7, 1897	Oct. 14, 1897
6. Albertina G.	29	III	Two labors at term; all difficult forceps; infants stillborn.	Flat	9.00	Right shoulder	Feb. 10, 1897	Nov. 17, 1897
7. Mary L.	24	I	.....	Flat	9.00	R. O. A.	Sept. 27, 1897	July 4, 1898
8. Mary McG.	39	V	Four labors at term; difficult forceps; all infants stillborn.	Flat	9.25	L. O. A.	Not known	Oct. 9 (estimated from quickening).

OF LABOR BEFORE FULL TERM.

Labor induced before term.	Duration of labor.	Method of delivery.	Puerperal convalescence	Infant.							Remarks.
				Weight.	Bitemporal.	Biparietal.	Occipitofrontal circumference.	Condition at birth	Condition on discharge.	Present condition 1908 (July).	
	Hrs.				cm.	cm.	cm.				
One week	22	Natural	Normal	7 lbs. 2 oz.	8.00	9.00	34.0	Normal	Normal	Living	
Sixteen days	36½	Natural	Normal	7 lbs.	8.00	9.25	33.0	Dead	....	....	Prolapsed cord pulseless when discovered; large spina bifida incompatible with life; length of cord 85 cm.
Two weeks	11	Natural	Normal	6 lbs. 12 oz.	7.00	8.50	32.0	Normal	Normal	Living	
Two weeks	6½	Natural	Normal	6 lbs. 2 oz.	7.00	8.00	31.0	Normal	Normal	Living	
Eighteen days	34½	Version	Normal	6 lbs. 3 oz.	7.00	8.00	32.0	Normal	Normal	Living	
Four weeks	23	Version	Normal	7 lbs. 4 oz.	8.00	8.75	32.0	Normal	Normal	Living	
Three weeks after calculated term	34	Natural	Normal	6 lbs. 4 oz.	7.00	8.75	31.5	Normal	Normal	Living	Admitted June 22, about two wks. before estimated term; relative size of head to pelvis (estimated), permitted pregnancy to continue to July 25, estimated as nearly two weeks prior to full term.
Three weeks	37½	High forceps	Normal	6 lbs. 14 oz.	8.00	9.00	32.5	Normal	Dead	....	Death of infant on fifteenth day from omphalitis. Quickening occurred May 14.

TABLE A (*Continued*).—HOSPITAL CASES:

	Age.	Gravida.	History of previous labors.	Variety of pelvis.	True conjugate. cm.	Presentation and position.	Last catamenia.	Confinement expected.
9. Elizabeth A.	25	III	See Case No. 6.	Flat	8.50	L. O. A.	Dec. 12, 1898	Sept. 19, 1897
10. Annie D.	23	III	See Cases Nos. 3 and 5	Flat rachitic	8.75	Breech	Jan. 10, 1899	Oct. 17, 1899
11. Catherine McL	39	V	See Case No. 5.	Flat rachitic	8.00	L. O. A.	June 11, 1899	Mar. 18, 1899
12. Mary H.	33	VI	One miscarriage; two premature stillbirths; two living children (small) after forceps.	Flat	8.75	R. O. A.	Sept. 18, 1899	June 25, 1900
13. Annie D.	25	IV	See Cases Nos. 2, 3, 10.	Flat rachitic	8.75	L. O. A.	Sept. 12, 1900	June 19, 1901
14. Catherine McL	39	VI	See Cases Nos. 5 and 11.	Flat rachitic	8.00	L. O. A.	Jan. 6, 1901	Oct. 13, 1904
15. Catherine McL	40	VII	See above Cases Nos. 5 and 14	Flat rachitic	8.00	L. O. A.	June 17, 1902	Mar. 24, 1903
16. Mary O'R.	28	II	First labor; difficult forceps, infant stillborn: three doctors in attendance.	Flat	9.50	L. O. A.	Oct. 14, 1902	July 21, 1903
17. Daisy P.	31	III	First labor induced by Dr. Dorland; infant living. Second labor induced by Dr. Sprenkel; infant died from omphalorrhagia.	Flat	8.50	L. O. A.	March, 1903 (Date uncertain; probably in Mar.)	Dec. 28, 1903 (Probable estimation.)
18. Catherine McL	41	IX	See Cases Nos. 5, 11, 14, 15.	Flat rachitic	8.00	R. O. A.	Feb. 7, 1903	Nov. 14, 1904
19. Margaret McD	35	IV	3 forceps deliveries; 2 infants stillborn.	Flat rachitic	9.00	S. O. A.	April 24, 1907	Feb. 1, 1908
20. Bertha M.	30	VI	3 difficult forceps deliveries. Children survived.	Rachitic	10.0	R. O. P.	Nov. 22, 1905	Aug. 29, 1906

INDUCTION OF LABOR BEFORE FULL TERM.

Labor induced before term.	Duration of labor.	Method of delivery.	Puerperal convalescence	Infant.							
				Weight.	Bitemporal.	Biparietal.	Occipitofrontal circumference.	Condition at birth.	Condition on discharge.	Present condition 1908 (July).	Remarks.
	Hrs.				cm.	cm.	cm.				
Ten days	53	Natural	Normal	7 lbs. 13 oz.	7.75	8.75	32.0	Normal	Normal	Living	
Two weeks	52½	Breech extraction	Normal	4 lbs. 5 oz.	7.00	8.00	29.0	Asphyxiated	Dead	....	Infant died 12 hrs. after birth. Date of last catamenia acknowledged by patient to be an error. Pregnancy terminated at least six weeks before term in consequence of that error.
Three weeks	48	Version	Normal	7 lbs. 1 oz.	8.25	9.25	34.0	Normal	Normal	Living	
One week	38	Natural	Normal	6 lbs. 14½ oz.	8.00	9.00	32.5	Normal	Normal	Living	
Two weeks	21	Natural	Normal	7 lbs. 6 oz.	7.50	8.75	32.0	Normal	Normal	Living	
Three weeks	29	Version	Normal	6 lbs. 9 oz.	7.25	8.25	32.5	Normal	Normal	Living	
Eighteen days	31	Natural	Normal	6 lbs.	7.00	8.00	31.0	Normal	Normal	Living	
Nineteen days	26	Natural	Normal	7 lbs.	8.00	8.50	32.0	Normal	Normal	Living	
Two weeks	9½	Natural	Normal	5 lbs. 8 oz.	7.50	8.75	31.0	Normal	Gaining in weight	Living	Dates of last period and quickening not definitely known. Infant in incubator four weeks.
Four weeks	20½	Version	Normal	5 lbs. 13 oz.	8.00	9.50	12.0	Normal	....	Living 1908	
Two weeks	6½	High forceps	Normal	8 lbs. 12 oz.	9.00	10.0	12.0	Asphyxia revived	....	Living	
Ten days	12	Natural	Normal	7 lbs. 10½ oz.	8.00	9.50	12.5	Normal	....	Living	

TABLE B.—HOSPITAL CASES: INDUCTION

	Age.	Gravida.	History of previous labors.	Variety of pelvis.	True conjugate. cm.	Presentation and position.	Last catamenia.	Confinement expected.
1. Annie G.	28	I	.....	Flat rachitic	8.50	R. O. A.	May 17, 1895	Feb. 14, 1896
2. Elizabeth D.	32	III	First labor, difficult forceps; infant stillborn, second labor at Retreat; admitted 10 days beyond term and in labor. High forceps. Infant died in 48 hours from aspiration pneumonia.	Flat	9.50	L. O. A.	Dec. 26, 1895	Oct. 2, 1896
3. Maria V.	35	VII	3 miscarriages, 3 forceps. All babies stillborn.	Justo-minor	9.75	L. O. P.	Oct. 16, 1894	July 23, 1895
4. Elizabette P.	19	II	Living 3½ lb. infant after a 3 days' labor and forceps delivery.	Flat rac itic	9.00	L. O. A.	Dec. 29, 1894	Oct. 8, 1895
5. Annie Le.D.	38	VII	3 miscarriages, 2 forceps infant stillborn.	Justo-minor	10.0	L. O. A.	April 27, 1906	Feb. 1, 1907
6. Matilda A.	20	I	.....	Rachitic	10.0	L. O. A.	Aug. 22, 1906	May 29, 1907
7. Louisa H.	20	I	.....	Flat rachitic	10.0	R. O. A.	April 29, 1907	Feb. 4. 1908
8. Agnes de N.	22	I	.....	Justo-minor	10.0	L. O. A.	May 25, 1907	March 1, 1908
9. Mary H.	17	I	.....	Justo-minor	10.0	L. O. A.	May 12, 1907	Feb. 15 or 17, 1908
10. Mary W.	18	I	.....	Justo-minor	10.0	L. O. H.	July 21, 1907	April 28, 1908

OF LABOR AT OR LATER THAN FULL TERM.

Labor induced before term.	Duration of labor. Hrs.	Method of delivery.	Puerperal convalescence	Infant. Weight.	Bitemporal. cm.	Biparietal. cm.	Occipitofrontal circumference. cm.	Condition at birth	Condition on discharge.	Present condition 1908 (July).	Remarks.
	93	Version followed by craniotomy	Normal	7 lbs.	8.50	9.50	35.0	Dead	....	....	Admitted Feb. 9. Delivered by assistant, Dr. H. W. Hassell. Occiput posterior after version; chin locked above symphysis; infant perished and finally delivered by craniotomy.
At term (estimated)	13	Natural	Normal	5 lbs.	7.00	7.60	29.0	Premature and feeble. Died after 24 hours	....	....	Patient admitted one month prior to calculated term. Three inches of fat in abdominal wall: infant very small; labor not induced until calculated term had been reached. History of menses and quickening erroneous.
4 days after time	14½	Version	3 days elevated temperature	9 lbs. 12 oz.	8.50	9.50	..	Stillborn	....	....	Cesarean section not permitted.
8 days after term	10	Natural	Normal	6 lbs. 2 oz.	7.50	9.00	..	Normal	Normal		
3 days after term	11¾	High forceps	Normal	5 lbs. 11 oz.	7.50	10.0	36.0	Normal	Normal		
15 days after term	24	Natural	Normal	6 lbs. 14 oz.	8.00	9.25	..	Normal	Normal		
17 days after term	25	High forceps	Normal	7 lbs. 5 oz.	8.75	9.50	3.50	Asphyxia	....	....	Died 10⅓ hrs. after birth; compression.
At term	5	Natural	Normal	6 lbs. 9 oz.	7.50	9.50	35.5	Normal	Normal		
10 days after term	2⅓	Natural	Normal	7 lbs. 10 oz.	7.50	9.00	34.0	Normal	Normal		
23 days after term	28½	Natural	Normal	6 lbs. 6 oz.	9.25	10¼	34.5	Normal	Normal		

TABLE C.—PRIVATE PATIENTS: INDUCTION OF LABOR BEFORE TERM.

Name and year.	Gravidia.	History of previous labors.	Variety of pelvis.	True conjugate.	Labor induced before term.	Method of delivery.	Infant.	
							Condition at birth.	Present condition.
1. Mrs. D., 1894	I	.....	Simple, flat	9 cm.	14 days	Forceps	Normal	Living
2. Mrs. C., 1895	II	High forceps; infant stillborn; fracture of skull.	Flat, rachitic	8½ cm.	18 days	Version	Normal	Living
3. Mrs. W., 1899	I	.....	Simple, flat	9½ cm.	14 days	Natural	Normal	Living
4. Mrs. H., 1901	I	.....	Flat, rachitic	8¾ cm.	15 days	Forceps	Normal	Living
5. Mrs. M., 1902	II	Difficult forceps; fracture of pelvis; infant survived.	Simple, flat	9¾ cm.	14 days	Forceps	Normal	Living
6. Mrs. H., 1903	II	Labor induced three weeks before term; infant living.	Flat, rachitic	8¾ cm.	14 days	Natural	Normal	Living
7. Mrs. T., 1903	III	Two stillborn infants; high forceps.	Simple, flat	9 cm.	14 days	Forceps	Normal	Developed aspiration pneumonia on fifth day.
8. Mrs. S., 1905	II	High forceps; infant deeply asphyxiated, but revived.	Justominor	10 cm.	14 days. Head not in pelvis.	Natural	Normal	Living
9. Mrs. C., 1906	III	Two version and extraction at term; one stillborn infant.	Flat, rachitic	9 cm.	3 weeks	Version	Stillborn	
10. Mrs. H., 1908	IV	Two high forceps; infants large and stillborn; one miscarriage.	Justominor	8½ cm.	4 weeks	Breech extraction	Asphyxiation; recovered	Living

TABLE D.—INDUCTION OF LABOR AT TERM.

1. Mrs. L., 1902	I	.....	Justominor	10 cm.	At term	Forceps	Normal	Living
2. Mrs. C., 1902	II	Stillborn infant after difficult version at term.	Flat, rachitic	9 cm.	At term	Version	Normal	Died on third day from sudden intraperitoneal hemorrhage (autopsy).
3. Mrs. R., 1902	I	.....	Simple, flat	10 cm.	At term	Forceps	Normal	Living
4. Mrs. S.	I	.....	Justominor	10 cm.	At term	Forceps	Normal	Living

The patient left her bed on the twenty-fifth day and walked without difficulty. Examination at that time found no trace of callus on the posterior surface of the bone; on the anterior surface there was some thickening that gradually disappeared. The accompanying *x*-ray photographs show the results to the incised bones.

Indications, Advantages, and Accidents. The degree of pelvic deformity indicating pubiotomy is the same as that ordinarily given for the relative indication of Cesarean section, *i. e.*, a conjugata vera to 7 cm. The majority of operations thus far have been done for cases with contraction between 7 and 8.5 cm. To replace embryotomy it has also been recommended and performed in cases of impacted face or brow presentation. It has been recommended to place the saw ready for section of the bone as a prophylactic measure when about to extract a difficult breech presentation or after version. Aubert (*Revue médicale de la Suisse romande*, 1906, No. 1) believes it will replace the induction of labor for the lesser degrees of pelvic contraction. A view of the more enthusiastic supporters has even justified its performance without subsequent retaining dressing in order to permit of permanent enlargement of the pelvis. A new operation is always carried to extremes, and pubiotomy will doubtless show the same history in this respect as did symphysiotomy. The increase in the diameters is given by Van Cauvenberghe (*L'Obstétrique*, January, 1905) from experiments on seventeen cadavers as follows: A separation of the cut ends of the bone of 3 cm. increased the conjugata vera 1 cm.; the transverse, 1.4 cm.; both oblique diameters, 1.3 cm. A separation of 4 cm. is likely to damage the sacro-iliac joint. Waldstein (*Zentralblatt f. Gynäkologie*, xxx, 7) declares the conjugata vera in the normal pelvis is increased 8 per cent. of its length; in the rhachitic pelvis over 25 per cent. The space gained is about the same as is gained with symphyseotomy with equal separation of the bones.

The advantage of pubiotomy lies in the fact that the supports of the bladder and urethra and the clitoris and structures behind the symphysis are not only not cut, but also are not so likely to be lacerated by the bilateral traction caused by the separation of the bones.

Lacerations of the vagina and unavoidable hematomata have been the most frequent accidents thus far reported. Under aseptic conditions these really are not serious and often may be avoided by a proper technique of operation and by a proper method of delivery. Bauereissen (*Münchener medizinische Wochenschrift*, 1905, Nrs. 51, 52) has demonstrated that the hemorrhage originates especially from the corpus cavernosum, the bulbus vestibulæ, the vesical plexus, the veins of the urogenital diaphragm, and possibly the pubic branch of the inferior epigastric and obturator arteries. This complication of hemorrhage or hematoma has led to the discussion of three methods of operating—the open, the partially subcutaneous and wholly subcutaneous methods. With my present light on this question I shall again use the partially subcutaneous method, hoping to avoid hemorrhage, as has so frequently happened; but at the occurrence of serious bleeding I would not hesitate to change at once to the open method, cutting down to the bone and controlling the bleeding by ligation. Hemorrhage from the vulvar veins ought to be avoided, and was in my cases by drawing the vulva firmly to the median line, when the lower puncture is made and holding it there until the bone is cut through.

The other accident, tearing of the vaginal or cervical attachments, ought to be avoided by careful delivery after section of the bone. Spontaneous delivery, as has been urged by many operators, and especially in primigravidæ, ought not to be necessary if the soft parts have been prepared by thorough dilatation, as can be done by the large-size Pomeroy bag, which I have found most efficient, allowing it to remain in place fully distended for two or three hours if not spon-

taneously extruded by the strong pains it usually excites. The cases in which extensive lacerations of the vagina have been reported have usually been posterior positions, and this fact should make us cautious about forcible and rapid anterior rotation. Bauereissen (*loc. cit.*) has called attention to the fact that instrumental delivery increases the danger of tearing the vagina, and that the laceration of the deep transverse perineal muscles eventually leads to vaginal prolapse. The pelvic floor is drawn upward as the bones separate; the depth of the vagina is thus shortened and rotation interfered with. Forcible rotation should be most cautious and will be least dangerous when the soft parts have been overdistended and stretched by the preliminary use of the large Pomeroy bag. Manual rotation at the brim of a posterior occiput, converting the latter into an anterior position before applying forceps, is a valuable means of preventing the lacerations that have occurred at the site of the incised bone, when the rotation is accomplished with the forceps after the head has entered the pelvic cavity. During traction with the forceps it is a precaution to have assistants make counterpressure upon the trochanters to prevent too wide separation. Sellheim (*Beiträge zur Gebürtshülfe*, x, 3) advises against the employment of the Walcher posture, declaring it, after section of the pubes, to be not only superfluous, but positively dangerous to the capsular ligaments. The increase in the conjugate is for the most part at the expense of the sacro-iliac joint, hence the section should be made on that side through which the biparietal diameter of the head must pass. The breaking of the saw is an accident that has frequently occurred, and warrants having in readiness more than one saw. The frequent occurrence of hematomata after the subcutaneous operation calls for most careful asepsis. The tip of the needle should be held firmly in contact with the posterior surface of the pubic bone under the periosteum, if that is possible, during its passage. By this means the cutting of bloodvessels

with the saw is avoided. Rupture of these same bloodvessels when the cut ends of the bones separate is an accident not always to be avoided. Using the finger as a guide in passing the needle helps to push the bladder aside and prevent its injury.

From this brief discussion of the operation it will be seen that there are many accidents that can attend pubiotomy, and that it is an operation to be undertaken by those who possess some surgical skill. In the hands of the average surgeon in private practice it appears to me as certainly safer than Cesarean section, and the future may prove that even in the expert's hands and in a well-equipped clinic its results will make it replace the elective Cesarean operation for its relative indication.

Induction of Premature Labor. The recent writings of most American obstetricians follow those of continental Europe in condemning the induction of premature labor in the treatment of labor obstructed by pelvic contraction because of the high fetal mortality, and I am in hearty accord with that teaching for the major degrees of disproportion. For the lesser degrees of contraction represented in a general way by the pelves with conjugates between 11 and 8 cm., I am convinced that the skilful induction of labor, never before the eighth month and at the latest period of pregnancy permissible by the studied disproportion, not only should not be abandoned, but deserves a more general application by the profession to the elective treatment of the lesser degrees of disproportion. The results of Nature's unaided efforts at term—the so-called expectant treatment—is the one unanswerable argument of those who maintain the necessity of the test of labor in moderate disproportion. To aid Nature by bringing the patient to labor two to four weeks before term increases her efficiency and is no detriment to the child.

Krönig (*Die Therapie beim engen Becken,* Leipzig, 1901) and Zweifel have studied a large series of obstructed labors

in Leipzig, and with conjugates in flat pelves between 8.5 and 9.5 cm. assistance was required in 2.7 per cent. of the cases, and in even the generally contracted pelves (272 cases), with conjugates between 8.5 and 9.5 cm., no assistance was required. My plea is that it is sound obstetrics to give Nature the little assistance she may need to save the children that without this aid are frequently lost through errors in obstetric judgment after version or a difficult forceps extraction at term. Induction of labor gives that assistance, and if more generally indorsed by the obstetric leaders it will more efficiently teach the profession to study their cases before labor than the doctrine of early Cesarean section, because the former is within their obstetric judgment and surgical skill while the latter is not. To accomplish the best results after the induction of premature labor, two additional problems are added to the study required for the elective Cesarean section. These are the determination of the duration of pregnancy, and the care of the premature infant after its birth. The interruption of pregnancy must not be earlier than the degree of disproportion demands, nor at a period so late that a difficult operative delivery is required which increases the mortality even of children not excessively premature.

At first thought this would seem to increase the burden of knowledge required of the general practitioner, but on investigation it will appear that these problems are more easily and safely determined by him, and their solution renders less dangerous the errors he may make in the more difficult problem of accurate estimation of relative disproportion between head and pelvis. Given a conjugate between 8 and 10 cm., a head not unduly large, the patient at the eighth month of pregnancy and a reliable method for instituting labor, and the problem is solved. The dangers of infrapubic operations, in cases of prolonged pregnancy, are prevented by the induction of labor and is additional argument for its more general application.

The determination of the exact duration of pregnancy or its equivalent, the degree of prematurity of the child at the time selected for terminating the pregnancy, is the only practical difficulty of this subject. Pinard's tables of average measurements of the bitemporal diameters compared with results obtained by Stone's or Perret's methods afford some help. Müller's suprapubic pressure should also be used to study the disproportion. Reliable knowledge of the cessation of menstruation and of the date of quickening, the probable date of conception, of which sometimes the patient, for some special reason, believes she has knowledge, give the best criterion for judging the duration of pregnancy. The possibility of conception having occurred in the premenstrual and not in the usual postmenstrual days can be a source of error of as much as two or three weeks. The date of quickening to some extent checks this error, but when the probable date of conception is thus in doubt, if the other factor, the relative size of the head to the pelvis will permit it, the date selected for inducing labor should be deferred from ten days to two weeks.

The errors that may be made in selecting the time for interference is the common objection to inducing labor. Wnen it is remembered that labor is not to be induced prior to the eighth month, an error of ten days or two weeks, which is not common in the predictions we make for the dates of confinement of our patients, will not seriously detract from the value of induced labor for moderate pelvic deformity.

The other objection—the inefficient means at our disposal for terminating pregnancy—can only be offered by those who have little or no experience with inducing labor. The method I now employ is that referred to above, when discussing the means to shorten the first stage of labor. The patient is anesthetized if necessary and the cervix is dilated with a two-branched dilator, aided by the index-finger, to 8 cm., which will not produce laceration, and the large-size Pomeroy

bag is at once placed. The cervical compartment is filled with sterile water, the vaginal compartment is partially distended, and the anesthetic is removed. At intervals of fifteen to thirty minutes the vaginal compartment is gradually filled until completely distended by a forceful piston syringe. The bag remains in place until extruded by the forces of labor, which it usually promptly calls into existence. If not extruded, intermittent tractions are made. In my hands it has never failed to terminate the first stage of labor more promptly than any method heretofore employed. After several hours of strong pains, the patient being in the Walcher posture as much of the time as her comfort will permit, the progress of labor is observed. Operative assistance is deferred for a somewhat longer period than at term because of the increased risk to the child from forceps or version. After a fair test of the natural forces, which usually are sufficient, an operative delivery is undertaken, guided by the conditions that may be present and by the principles which determine the choice of procedure in a labor at term.

Analysis of the appended tables shows that of 20 cases of induced labor in hospital practice and 10 cases in private practice, the conjugates ranging between 8 and 10 cm., labor was induced from two to four weeks before term depending upon the estimated disproportion. The primary infantile mortality in these cases was three stillborn infants, and one infant's death on the fifth day from aspiration pneumonia. The death of one of the stillborn infants was due to prolapse of the umbilical cord—a very rare accident in induced labor. (Less than 1 per cent. in my experience.) A second stillbirth was due to an error in calculating the duration of pregnancy, the result of deception on the part of the patient. The third stillbirth followed a difficult version on a patient presumably four weeks before term, in whom an error in calculation had also been made. There was no maternal mortality and no morbidity. In contrast with

these results the tables showing the infantile mortality of cases for which labor was induced at or subsequent to full term are most instructive. In 14 such cases, with a range of pelvic obstruction averaging less than in the former class, there were 8 operative cases as compared to 13 operative cases in the 30 cases. More important, however, is the fact that there were 5 infantile deaths in 14 cases as compared to 3 deaths in 30 cases in which labor was induced before term—a respective infantile mortality of 39 and 10 per cent. An additional table of induced labor during the last three years of private practice for prolongation of pregnancy in primiparæ who had reached or advanced beyond term with the head freely movable above the pelvic inlet, shows in 14 cases six forceps deliveries with no maternal mortality and the loss of one infant. Thus in 58 cases of induced labor there has been no maternal morbidity or mortality, and the infant mortality has been 14 per cent., the large proportion of which followed labors induced at or beyond full term. My experience in these cases of labors induced at or past term, associated with difficult subpubic operative delivery, was acquired several years ago. Today they would be delivered after the test labor by section of the abdomen or pubis. That experience, however, has taught me that induction two to four weeks before term is a most useful operation to prevent difficult operative delivery and high infant mortality at term. When the cases are at term, induced labor aids natural delivery and increases the safety of a test labor; but after that aid has failed forceps or verson must be more and more abandoned for pubiotomy or Cesarean section. My experience justifies that conclusion. As to the choice of those operations I must confess that my training in abdominal surgery and my knowledge of the modern technique of the section forces me, like most American obstetricians, to prefer the abdominal method. Future study and experience may change this attitude. When a patient escapes the

dangers of peritoneal infection and hemorrhage and recovers from the Cesarean operation, the story is not wholly told. The abdominal scar, adhesions, fistulæ, hernia, subsequent uterine rupture, and the general strain upon the patient, while dependent in large measure upon the technique of the operator, are not to be entirely omitted from the comparison between the after-histories of pubiotomies and Cesarean sections. The enthusiasm for pubiotomy that exists abroad, and especially in Germany, and its reluctant acceptance by America, can only be explained in one way—either they are dissatisfied with their results of Cesarean section or we are better abdominal surgeons and are satisfied with ours. I can scarcely believe that is true, and, therefore, conclude that we should give pubiotomy an extensive trial, as they are now doing.

Obstruction to labor due to anomalous conditions of the cervix requires but brief discussion. I have recently expressed my views on "Artificial Dilatation of the Cervix" in *American Medicine*, May 20, 1905, vol. x, No. 20. For relatively slow dilatation the use of Voorhees' or Pomeroy's bags, preceded by partial instrumental dilatation, has supplanted all other methods in my experience. Measured by the standard of relatively quick results, by its physiological effacement of the cervix, and by the absence of lacerations associated with the rapid manual and instrumental methods, it has been wholly satisfactory. For the group of cases that require relatively rapid opening of the lower birth canal, such as obstruction to the cervix due to cancer, stenosis, myoma, or extreme rigidity, and for grave maternal conditions which may be relieved by prompt emptying of the uterus, Dührssen's vaginal hysterotomy, or some modification of it that may be indicated by special conditions, is infinitely safer, more surgical, and more certain than any other means known to modern obstetrics.

My remarks have been dictated by personal experience and

are offered to introduce these most important topics in obstetrics for your discussion. What you will have to say will determine for a large number of American obstetricians the guiding principles of their daily work among thousands of women. That you will be learned and guided by the wisdom of experience goes without saying. Our session deserves that you be practical as well as philosophical, and that your discussions shall be brief and to the point.

THE CHOICE BETWEEN THE INTRAPELVIC AND ABDOMINAL METHODS OF DELIVERY IN THE LESSER (NON-ABSOLUTE) DEGREES OF MECHANICAL OBSTRUCTION.

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It must not be forgotten that it is still true that operative obstetrics covers, and should cover, but a small percentage of the gross amount of obstetric work, and with the operative movement which is coming over the specialty it is perhaps not unwise to emphasize at the beginning of any such discussion as this that successful normal labor is still, and must always remain, the best method of delivery.

In the percentage of cases which are necessarily operative, the choice between the different methods of delivery which are possible must depend upon consideration of the relative maternal and fetal mortalities and morbidities which may be expected of the different methods under the conditions of the individual case, and the consideration of this question is our present subject.

The dangers of intrapelvic operating to mother and child are all of them those which result from hard or rapid pulling. When the conditions are such that extraction is possible without hard pulling, the intrapelvic operations under modern conditions and in skilled hands are minor operations. When such ordinary indications as inertia uteri, malpositions,

prolapsed cord, etc., make operative extractions necessary in cases with large pelves and lax soft parts, as in multiparæ who have always had easy labors, any experienced obstetrician knows that he can extract by the intrapelvic methods with a minimum of danger so exceedingly small as not to exceed that of ordinary labor to either mother or child. In these very easy cases the only element in which the disadvantages of the operative extractions can really be held to exceed those of natural labor is in a possibly somewhat greater risk of the minor lacerations; but in multiparæ with really lax soft parts even this disadvantage is a very small one. Modern obstetrics applies these extractions fearlessly to conditions which but a few years ago would have been allowed to drag along unendingly. Unnecessary as it may seem to insist upon such a point in this presence, it is again perhaps important at the present moment that this Society should emphasize in its presentations that for such simple cases any contemplation of the Cesarean section is out of order.

It is only when operation is indicated for mechanical obstacles, whether due to the shape and dimensions of the bones or to abnormal conditions of the soft parts, and when these obstacles are of such degree as to involve hard pulling, that the question as between the intrapelvic and abdominal methods of delivery is in order. This question may eventually be decided in any case in favor of one or the other side, but it should certainly be considered in every such difficult case.

As has already been said, both maternal and fetal mortalities and also morbidities must be given consideration in making the choice; but the Anglo-Saxon profession will still be disposed to admit, and indeed to uphold strongly, the long-established Anglo-Saxon belief that the maternal mortality is the more important of the two death rates and should exercise a preponderating influence in the choice of methods whenever it can be shown to be markedly variable

as between them. It is only when the mother is already moribund or when the maternal mortalities are essentially equal that the choice of methods should depend upon their relative fetal death rate. Similarly, mortality is always more important than morbidity, and it is only when mortalities are essentially the same that relative morbidities become important, but in such cases they also may often cast the deciding vote.

If, then, maternal mortality is to be the first and most important consideration in the decision, much must depend upon the period of labor at which the indication for operation arises, and this point is so important that it must for the moment take precedence of the other indications.

Although the maternal mortality of the intrapelvic methods increases somewhat with the progress of maternal exhaustion before operation is undertaken, it increases but slowly, while that of the abdominal method increases much more rapidly. If, then, again maternal mortality is to be the first consideration, it follows that during the later part of labor the use of the abdominal method should be restricted to the absolute indication, *i. e.*, to those few cases where no intrapelvic operation is possible; but if, on the other hand, it can be shown that earlier in labor the maternal mortalities of the two routes are equal or not greatly different, then at that time the choice of methods in cases which are necessarily operative should be made or partly made by consideration of their relative fetal mortalities, and maternal and fetal morbidities.

These two propositions I believe to be tenable, and it is these two propositions that I first wish to bring before you by a little more detailed consideration of the advantages and disadvantages of the two methods, and more especially of their mortalities, considered late in labor, in the course of labor, and at the beginning of labor.

It would seem at first sight that it should be exceedingly

easy to ascertain statistically the mortalities of the intrapelvic operations which are so constantly performed. I have been surprised to find that it is not easy. I have been unable to find any statistics which are at once authoritative and recent. An analysis which I made some time ago of results obtained at the Boston Lying-in Hospital showed seventy-five consecutive high operations with no deaths, and in my own experience, both when connected with the staff of that institution and in consultation practice, I can now remember but two deaths in cases operated upon for mechanical indications only. Most authorities content themselves with stating on this point that the maternal mortality for the intrapelvic operations is undoubtedly present, but undoubtedly low. Excluding pathological conditions which have their own death rate, and should be considered as separate questions under their own individual headings—in short, confining the question to cases of mechanical obstruction or relative mechanical obstruction only—it could probably be reduced to the rare accidental mortalities; indeed, where the mother is in fair condition at the beginning of the operation and in skilled hands from the beginning of labor, it should probably not rise above 1 per cent. Even here it is difficult to make more than an estimate of this mortality. There are probably comparatively few men whose personally conducted high extractions can be reckoned by the hundreds; and they would probably be the first to admit that a hundred consecutive operations of this kind with but one death from any cause was a creditable performance. Under less favorable conditions and in less skilled hands the maternal mortality of these operations is probably very considerably higher. The most essential point in this connection is, however, that while the maternal mortality of intrapelvic operations in moderately neglected labor, *i. e.*, after the appearance of moderate maternal exhaustion, is undoubtedly higher than when the operation is done at the time of election, it is not very greatly higher.

In contrast, the maternal mortality of the late Cesarean section is very large, rising in accordance with the amount of maternal exhaustion which is present at the time of operation, from a mortality of perhaps 5 or 6 per cent. at the time when the signs of exhaustion are first to be definitely detected, until in long-neglected labor it would probably be conservatively stated if placed at 25 per cent.[1]

The fetal mortalities of the intrapelvic methods performed late in labor are undoubtedly very high, while the fetal mortalities of the late section remain low; but the maternal mortality of the late section is so great that it will be generally conceded by the Anglo-Saxon profession that it should never be chosen while the extraction of a living child by the intrapelvic methods is in any way probable. Indeed, if we are to adhere to the time-honored principle that whenever the interests of the mother and child are distinctly opposed to each other, the life of the mother is the more valuable, the classical section in neglected labor should be excluded from consideration, except in the rare cases in which the delivery of even a decerebrated child is impossible, or when the mother is already moribund and the child alive. Most of the leading authorities now concede this principle, and I wish to be on record as most emphatically in support of it. In these unfortunate cases the intrapelvic route is always the method of choice so long as it is possible; when it is impossible the choice between craniotomy, Frank's recent operation of extraperitoneal section, perhaps the old-fashioned Porro operation, and perhaps in a very few cases the otherwise discredited divisions of the pubes, is still *sub judice*, but is a question into which lack of space forbids me to enter here.

[1] For more careful consideration of these mortalities consult statistical statement in Transactions of the American Gynecological Society, 1907. Boston Medical and Surgical Journal, October 31, 1907.

The late section, that performed after the advent of definite exhaustion, is never a method of choice. When, however, in the absence of the absolute indication the question of the choice between the abdominal and intrapelvic methods of extraction is first brought up at the time of election for forceps or version—*i. e.*, after the presence of fairly prolonged labor, and before the advent of actual exhaustion—we are confronted by a different question. Under these circumstances the maternal mortality of the intrapelvic operations when performed for mechanical indications only and under reasonably favorable circumstances is essentially above 1 per cent. while, on the other hand, the maternal mortality of the section performed at this time—the secondary section—may be fairly summarized as varying with the circumstances of the individual case between 2 per cent. and 5 per cent.,[1] though the fetal mortalities of the intrapelvic methods are undoubtedly considerable while the fetal mortalities of the section should be nil. Under these conditions it is probable that if for any reason the choice rests wholly with the surgeon, he should revert to the long-established Anglo-Saxon principle that the mother is more valuable than the child, *i. e.*, that he should, if he is acting upon his own responsibility, choose one of the intrapelvic methods as the safest road for the mother, even if it involves an increased risk to the child. Upon the other hand, if after fair and impartial statement to them of the probabilities, the parents consent to a slightly increased maternal risk for the sake of a great increase of safety to the child, it is certainly rational to believe that the choice is theirs and that the surgeon should obey their bidding. This question should never, however, be permitted to arise a second time in the labors of the same woman; the same mechanical conditions will again be present, and after one such experience her subsequent labors should be dealt with by the far safer primary section.

[1] Loc. cit.

When for any reason it is apparent at the beginning of labor that the case must eventually be dealt with by some operative method, the problem is a simple one and easily to be determined by the relative advantages of the two methods as operations of choice.

Under these favorable circumstances the maternal mortality of the intrapelvic methods should not rise above 1 per cent., but when performed for mechanical obstacles their fetal mortalities must always be considerable.

The maternal mortality of the primary section has been reported as of no percentage.[1] It is certainly very low, but so far as my knowledge of the literature has enabled me to judge there is today no man living who has successfully performed one hundred consecutive primary sections; and although I think it would be possible to make from the literature of the subject more than one collection of a hundred primary sections done by a number of operators during a given time, without death, this could only be done by careful effort toward this end, and in an unprejudiced search it is probable that even in this simple and safe operation an accidental death rate of some sort would always crop up. It may probably be fairly estimated at about 1 per cent., or at all events as essentially similar and equal to that of the intrapelvic methods under the same favorable circumstances. Its fetal mortality is, upon the other hand, nil, and its percentage of subsequent morbidity is much less than that of the intrapelvic operations.

This last statement may bear a moment's examination. Much has been written about a liability to painful adhesions, rupture of the uterus in subsequent labor and hernia in the scar after Cesarean sections, but I am sure that careful study of extended reports of cases will show that the liability to these disabilities is largely a bugbear in the class of sections which we are now considering. Adhesions undoubtedly

[1] F. Fromme, Berliner klin. Wochenschr., January 27, 1908, Nr. 4, 45 Jahrg.

occur after sections during neglected labor or upon infected uteri, but no abdominal operator of any experience needs to be told that the chance of troublesome adhesions after simple, rapid, favorable operations is exceedingly small, almost negligible. Rupture of the uterus in labors subsequent to the Cesarean section has undoubtedly occurred, but it is self-evident that if the mechanical conditions are such that a woman has once been rightfully subjected to a primary Cesarean section, she should not be allowed to go into labor at all in subsequent pregnancies, but should be again treated by the primary section. So, too, in the lax state of the abdominal wall after Cesarean sections and with modern methods of suture, hernia of the scar is becoming negligible in clean operations. Upon the other hand, the extensive lacerations, the disturbances of the urinary functions, the varied mechanical gynecological lesions which follow the difficult intrapelvic extractions in no small percentage of cases need no elaboration before this audience.

For these cases in which it can be known beforehand that delivery must eventually be done by some operative method, the primary Cesarean section is the operation of choice.

Theoretically, it is, then, desirable that all cases which are eventually to be submitted to the Cesarean section should be operated upon before labor. Practically, it is impossible to recognize all such cases in advance, but it may be laid down as a rule that all cases which can be recognized as such in advance should be operated upon by the Cesarean section, done at term in advance of labor or with the first pains, in order to secure the time of least maternal and fetal mortality and morbidity; and the most important opportunity for progress now before the obstetrical world lies in the effort to acquire increased power to recognize difficult cases in advance of labor.

In point of fact the amount of power which our present knowledge gives us in this direction has been underrated

and overshadowed by remembrance of our great weakness on this point in the past. It involves the study of all the mechanical and vital indications for the choice between the different methods of operative delivery as well as between operative delivery and natural labor; but as soon as one turns his attention definitely to this matter, a very few years of experience will convince him that the number of cases in which fairly positive predictions can be made is larger than he had supposed.

For this purpose multiparæ and primiparæ must be placed in different categories. Multiparæ with mechanical difficulties reach the specialist either because of one or more previous stillbirths or because they have themselves suffered severely in previous operative deliveries. In such cases, after the obstetrician has subjected the patient to the fullest possible physical examination, including a diagnosis of the shape of the individual pelvis, and the measurement of its diameters, and has checked the information so gained by careful consideration of the history of previous labors, including not only their duration but the character and efficiency of the pains, he should inform himself of the patient's general physical condition and "*staying power*" not only by a general medical physical examination, but by careful study of her history of past fitness or unfitness for exercise and sustained athletic effort and by the history of her condition, habits and of the care given her during the preceding pregnancies, with her improvement or loss of condition therein. He should then conduct the hygienic care of her present pregnancy, and watch her general functional and muscular condition as it progresses; and should finally estimate the exact mechanical conditions by a careful pressure examination of the relations between the individual pelvis and head made at term when there is no longer hesitation about the possible provocation of labor by such an examination. When all this has been carefully done, an experienced man is really

in a position in which he can judge with considerable accuracy of the labor which is to be expected, remembering that we are at present limiting ourselves to the consideration of multiparæ with definite mechanical difficulties. (If the patient is in her second pregnancy, the attendant must carefully estimate from the history and the present condition of the soft parts the amount of subtraction from the difficulty of her previous labor which should be allowed for her primiparity at that time; but if she has had more than one previous difficult labor, this source of difficulty is removed.) After all this amount of preparation, which is, however, no more than should be given to the study of any important case, there are but few cases in which a really experienced obstetrician cannot assign the patient to one of two provisional classes: (*a*) That in which the degree of mechanical difficulty, estimated in connection with the characteristics of the patient and the history of the past labors, convinces him that there is a fair chance of a spontaneous passage of the brim. If in such cases this fails to occur, there should at least be every probability of the delivery of a living child by the application of the intrapelvic methods, and to such cases properly conservative surgeons will still apply the intrapelvic operations; or (*b*) the class in which there is little or no probability of a spontaneous passage of the brim and in which the only probable choice is that between the different methods of operative delivery. Here there is always a possibility of hard pulling in the intrapelvic operations, and how hard it may be no one can ever tell. Here the maternal mortalities of the intrapelvic and primary abdominal methods are probably equal, the fetal interest is clearly on the side of the section, and the chances of maternal morbidity from injury are almost wholly confined to the intrapelvic side of the question. Here, then, the decision of the question will be influenced largely by the mental makeup and degree of experience of the individual consultant. Some will still be

influenced by tradition to the side of the painful, exhausting, dubious, and always uncertain intrapelvic extractions; more will today decide in favor of the painless, safe, and certain primary Cesarean section, the results of which can be clearly foreseen.

In multiparæ with mechanical difficulties, who have had previous unfortunate labors, and from whom the easy cases have been weeded out by painstaking study, I believe that there will be in the future but few deliveries other than by the primary Cesarean section.

In primiparæ the absence of the history of past labors makes the physical examination the more important element; but every primipara should be subjected to the same careful study of the vital and constitutional history for use in connection with the physical examination. In the lesser degrees of mechanical difficulty, the most obvious clinical division among primiparæ is that founded upon the age of the patient in connection with the state of her soft parts. Primiparæ of advanced age usually have lingering labors, owing to the less active condition of their uterine muscles and the lessened dilatability of their cervices; yet in the absence of bony mechanical difficulty the majority of them are in the end delivered by spontaneous labor, and when delay is due to the condition of the soft parts alone, it can usually be overcome better by early artificial dilatation than by any other method. When, however, such women present, in addition to their unfavorable uterine muscles and cervices, even moderate bony difficulties, the intrapelvic extractions are usually extremely hard and are liable to be attended not only by excessive lacerations, but by frequent loss of the child. In such cases, *i. e.*, primiparæ over thirty-five or thereabouts with rigid cervices and even slightly small or ill-shaped pelves, the chance of spontaneous delivery is so small and the percentage of fetal mortality and maternal morbidity in the intrapelvic operations is so large that with about even maternal

mortalities as between the two methods the primary Cesarean section is the better operation. It is further to be remembered that in these elderly primiparæ the fetal chances are always of great importance to the parents from the small likelihood of the mother's bearing many more children, and in this respect also the situation is quite different from that of the primipara of twenty, who, even though she loses one child, has yet the prospect of a large family before her. Even in elderly primiparæ it is only in marked neurasthenics of very low muscular and nervous endurance that the primary section should be ever considered in the absence of bony obstacle.

In young, strong, and elastic primiparæ the question is a different one. Here, with only moderate tightness of bony adaptation between the head and pelvis, the balance of a doubtful decision should probably always lean toward the intrapelvic operations, upon the basis that it is in such cases that we are least able to predict with any safety whatsoever the probable outcome of labor, and that the woman who has once gone through a labor, and if necessary an intrapelvic operation, will have in the future all the advantages of the multipara, both as regards the condition of her soft parts and also in the acquisition of that most useful of all guides—a knowledge of what her pelvic obstacle amounts to from actual experience in a previous labor; while she who is subjected to a primary Cesarean section as a primipara remains effectively a primipara, with undilated soft parts and with the same uncertainty about the actual problem in her second pregnancy.

Primiparæ, whether young or old, who have bony obstacle of such marked degree as to render spontaneous delivery impossible or essentially improbable, are from their very primiparity poor subjects for the intrapelvic operations and fit subjects for the primary Cesarean.

In summary, the positions which I wish to present to your consideration are: that while the elective Cesarean section

at the beginning of labor has been determined to have, when performed under favorable conditions, no greater maternal mortality than the intrapelvic operations at the time of their election and a lesser fetal mortality, in combination with, upon the whole, lesser morbidities to both patients, the maternal mortality of the section rises steadily in proportion to the length of labor endured before its performance, while the maternal mortality of the intrapelvic methods remains essentially stable until very late in labor; that it is, therefore, for the interests of the future of obstetrics that we should use every possible effort to extend the limits of our power of recognizing in advance those cases which are to be necessarily operative.

That while mere routine measurement of the pelvis presents, even when combined with estimation of the size of the fetal head, a very imperfect means of making such predictions in advance, careful and, if necessary, repeated estimation both of the shape and size of the individual pelvis, as well as of the vital and muscular "staying power" of the patient, considered in connection with the past history in multiparæ, will furnish predictions, the accuracy of which will be even now surprising to those who have not given special study to this point, and which may be rendered greatly more efficient by systematic and general study in the future.

That such work is not as yet within the powers of the general practitioner, but should be decided by him only in consultation with qualified obstetric experts.

That, in the present state of our knowledge, in multiparæ with mechanical difficulties who have already had unfortunate labors the presumption is that such results will be duplicated unless reason to the contrary can be demonstrated, and that such cases should, therefore, be subjected to the favorable primary section.

That in elderly primiparæ with mechanical difficulties and liable to the lingering labors characteristic of such cases and

in whom, moreover, the present fetation is of especial value from the comparative unlikelihood of future pregnancies, the balance of choice should incline toward the more certainly favorable, primary, Cesarean section.

That in young primiparæ with moderate mechanical difficulties and for whom the prospect of repeated pregnancies is good, the balance of choice in the first labor should be toward the endurance of labor and the performance of the intrapelvic operations at the time of their election, should they prove to be necessary, upon the understanding that future pregnancies in these women will be treated upon the basis recommended for such cases in multiparæ.

CESAREAN SECTION *VERSUS* SECTIONS OF THE PELVIS IN DEALING WITH MECHANICAL OBSTRUCTIONS TO CHILDBIRTH.

By A. Lapthorn Smith, M.D.,
Montreal.

A few years ago the writer was opposed to Cesarean section, but his objection was only relative and not absolute; for so long as the operation had a higher mortality than the condition it was intended to relieve he felt that it should be resorted to only in extreme cases. As soon as the technique had been so improved that there was almost no death rate to it, be became an ardent convert. And now we have found out that the high death rate which used to follow it was not due so much to the operation as to the delay in performing it. Any operation will have a high death rate when performed on infected and dying women. But if Cesarean section is performed early enough, it is the safest of all abdominal sections. Indeed, it may be called a benign operation, because it is free from the lacerations and bruises which are inevitable in the *accouchement forcé*, especially when the Bossi dilators are employed. These have a high death rate from hemorrhage and infection. With the modern Cesarean section there is neither of these causes of death. And it is surprising how quickly it can be done; one or two strokes of the knife and we are down to the uterus; an incision in the latter an inch long enables one to put the two fore-fingers into it, and to tear the incision up and down to about

six inches. The feet are caught and the whole ovum, placenta and all, is quickly drawn out and handed to an assistant, who opens the membrane and ties the cord. All this takes very little over a minute. With a good assistant to hold the two broad ligaments there is very little bleeding, certainly not more, but rather less, than is lost at an average normal labor. For convenience in sewing, the uterus can be lifted out and placed on a sterilized towel; the longest part of the operation being the sewing of the rent in the uterus with interrupted sutures. Although I employed this method in my three cases, I believe that a running catgut suture only taking in the muscle would hold the latter together, while another running suture of fine chromicized catgut would take care of the peritoneum. The mucous membrane requires no suturing. By this change in method of suturing the uterus, the total time from first incision to placing the last stitch could be easily reduced to less than thirty minutes; my cases took about forty. The most remarkable thing about the Cesarean section is the well-being of the woman afterward as compared with a forceps delivery. My two cases who recovered had absolutely no rise of temperature, which they almost surely would have had if the child had been dragged through the vulva. I have long felt that the terms milk leg and milk fever should be abolished and called by their true name, puerperal infection or septic absorption through the more or less severe lacerations of normal labor or the very severe ones of a forceps delivery. The woman who is delivered by Cesarean section before labor begins is not only saved all pain, but is saved all this danger. My third case was a primipara; she felt so well the day after the operation that she assured me again and again that it was a shame to keep her in bed. With regard to the child, I believe that it was more than a coincidence that it seemed to have neither pain nor ache enough to make it cry. The forceps have been and always will be an immense boon to women

with moderate degrees of mechanical obstruction, but there is another and quite large class of cases where the forceps inflict upon the child severe injuries—injuries the full extent of which is not yet recognized, being much more important than even the death of the infant.

I therefore think that the time is not far distant when women who so nearly die at every confinement that their family physician orders them to separate from their husbands (and thus break up their homes) may have such a safe and painless delivery by Cesarean section that they will cease to have the awful horror of becoming pregnant, which is becoming so widespread on this continent.

In a paper read ten years ago before the Southern Gynecological Association I pointed out that muscles which are not used atrophy, and that even the bones to which these muscles are attached grow smaller; in other words, that the overeducated underexercised woman who thinks and plans what others are to do, but does nothing herself, has a much more difficult task to drive the child through the smaller pelvis with less muscular power to do the driving than her working sister. I also pointed out that such women marry rich brain schemers, and if there is anything in heredity at all, these children will have larger heads than normal. If the child's head continues to increase in size and the mother's pelvis to grow smaller and her muscular power weaker, a normal labor will become, and, indeed, in many cases it has already become, almost impossible. No substitute for normal labor can compare with Cesarean section. The pubic operations all have the defect of causing an incised wound in a place where it is difficult to keep it aseptic, while they do not do away with the bruising which usually accompanies a forceps delivery. After one has taken the risk of hemorrhage in a place where it is difficult to control, one still has the risk of bruising and tearing and infecting the soft parts; the cutting of the pubic bone or

cartilage does nothing to make the passage through the soft parts less difficult. So that in all methods of artificial delivery at full term other than Cesarean section, we have to reckon on injuries to the soft parts, that is, the cervix, vagina, and perineum, and sometimes the bladder. These injuries are known and recognized to some extent to be the cause of puerperal deaths, but their full extent has not yet been admitted. Many a woman has had her uterus washed out and curetted until she died, while the real cause was septic infection of tears of the vagina and perineum. Over and over again the writer has been called in consultation to women who have been in furious labor for twenty-four hours and yet the head was not engaged. But the woman was exhausted and the situation intolerable to the patient, the family physician, and the friends. Something had to be done, and we did the best we knew in those days, namely, put on the forceps and dragged the head through. Often it required three people to hold the woman on the bed and two to pull on the instruments. The child was delivered, but generally dead; in some cases it lived, but with permanent injury to the brain. Sometimes we had to perforate the head of the living healthy child, in plain English, kill it for no fault of its own, but just because its mother's pelvis was too small. Whole chapters were written in standard books on obstetrics describing how to kill the child and cut it up, and every well-furnished obstetric bag was provided with proper cranioclasts and perforators. But today such treatment would be unjustifiable in a city or near a city where an expert can readily be found able and willing to do a Cesarean section and save both mother and child. Fortunately, these cases occur rarely in the country, where the women work and walk and marry men with normal brains. Up to within the last year or two it has seemed less shocking to kill the child and almost kill the mother, so long as delivery took place per vias naturales, than to do a benign and gentle operation where skill and

speed have taken the place of brute force. But the time has come, the writer thinks, when the family physician should shrink from killing the helpless child as well as from making the mother run an unnecessary risk of her life and health.

It will depend upon him, much more than upon the operator, whether Cesarean section shall have absolutely no death rate or not, for both of the lives concerned, according to whether they have both been seriously injured or not by forceful but futile attempts at instrumental delivery.

THE INDICATIONS FOR CESAREAN SECTION.

By Barton Cooke Hirst, M.D.,
Philadelphia.

It is the intention of this paper to discuss two questions in the study of indications for Cesarean section, namely, the reasons for preferring induction of labor within the last month of gestation in cases of moderate contraction of the pelvis, and the fallacy of the recent statements that Cesarean section is a dangerous operation if performed after some hours of active labor pains. To take up all the alternatives in obstructed labor—forceps, version, symphyseotomy, pubiotomy, induction of labor, vaginal and abdominal Cesarean section—would occupy more time than should be allotted to one paper; besides, there is little new to be said about forceps or version, and as for symphyseotomy and pubiotomy, after a trial of both I find them very much alike and equally objectionable. Pubiotomy, in my judgment, going the way of symphyseotomy, laparo-elytrotomy, and all the other substitutes for Cesarean section, will be little heard of in the future. The only valid argument in its favor at present is that it is safer than Cesarean section after a labor of some duration in which there have been vaginal examinations or intra-uterine manipulations. No one endowed with an ordinary amount of common-sense and experience could prefer it to Cesarean section if the two operations had the same mortality, in view of the necessity for numerous assistants, the danger of injury to the bladder, the likelihood of

an awkward hemorrhage in the subcutaneous operation, the dubious outlook for the infant which must traverse the birth canal, the imperfect union of the pubic bones, and the atrocious inconveniences of the woman's convalescence. No one with experience in both operations, I think, could prefer pubiotomy to Cesarean section unless he honestly believed it to be the safer operation. But statistics do not support this contention, and I hope to show that the evolution of Cesarean section has not ceased; that the best operative and aseptic technique enables one to resort to Cesarean section with impunity, in spite of hours of labor pains and even with an infected lower birth canal.

As to the first proposition, that induction of labor within the last four weeks of gestation is preferable to Cesarean section at term in cases of moderate contraction of the pelvis, in which a child of about five pounds in weight, with head diameters on the average 1 cm. less than normal, and with a compressible cranium, can easily pass through the birth canal or can be safely assisted through, whereas a full-sized child at term could not pass without experiencing fatal damage, even the most prejudicial advocates of Cesarean section or pubiotomy as against induction of labor will admit that the latter is the safer operation for the mother. The whole question, therefore, hinges on the safety of the infant. The hospital statistics of Germany would make the induction of premature labor appear little better than craniotomy, and, if they held good for one part of the world, would condemn the operation without further discussion. But they do not. Two years ago I published some statistics of more than 200 induced labors from one hospital service alone. My total experience has been a good deal more than double that figure. The result of this experience leaves me a firm believer in the efficacy of induced labor. Infants born at any time within the last three or four weeks have as good a chance of survival as if they were born at term, provided the

nursery and hygienic surroundings are good. It is futile to lay down fixed rules based upon pelvic size as to the necessity of inducing labor.

I have seen a woman at term deliver herself spontaneously through a true conjugate of $6\frac{1}{4}$ cm., while, as we all know, there may be insuperable difficulty with a conjugate of $8\frac{1}{2}$ or 9 cm. Antepartum, following the relative size of fetal head and maternal pelvis, the history of previous labors, the size of the parents, the diet of the mother, and her muscular development must all be taken into account.

The following conclusions are justified from the experience of those of us who have given this method a trial in scores of cases over many years. Women with conjugatæ veræ in the neighborhood of 8 cm. can be delivered safely and easily during the last month of gestation who at term would require Cesarean section or pubiotomy, and a number of these women have been subjected to the major operations in previous labors.

The mortality of the premature infants is little, if any, greater than that of infants born at term in unobstructed labors.

Finally, it is a significant fact, to be noted by the general physician who might study this discussion for his own guidance, that the warmest advocates for the induction of premature labor in cases of moderate contraction of the pelvis are those with the largest experience in the operation, while its bitterest opponents are those who have no personal experience with it at all.

The second proposition interests me more, viz., that there need be no dread of a Cesarean section after hours of labor pains if the operative and aseptic technique is good. The importance of this statement is obvious. If, in doubtful cases, Cesarean section were always resorted to before labor, we all know how many unnecessary operations would be performed. If a primipara is given twenty-four hours of

labor and a multipara twelve, a safe limit within which rupture of the uterus need not be feared, about two-thirds of the women would deliver themselves spontaneously, who, if treated according to advice recently given the profession, would be subjected to an unnecessary major operation.

It has been my rule of practice for a number of years to test a doubtful case by a sufficiently long labor, and in addition, often by a cautious application of the axis traction forceps for twenty minutes. Moreover, in my service in the University Hospital, many women are admitted after hours of labor and repeated examinations without aseptic precautions, and, nevertheless, are successfully delivered by Cesarean section. My experience in this operation amounts to 74 cases.[1] In the last six years there have been 35 operations. The majority of them have been performed after twelve to twenty-four hours of labor. The only death was that of a woman operated on before labor.

If the following rules of technique are observed, I claim that Cesarean section is a safer operation than pubiotomy. Cleanse the vulva and vagina as carefully as though for a major vaginal operation. Pack the vagina with sterile gauze; cover the abdomen with rubber dam; deliver the uterus from the abdominal cavity; pack off the abdominal cavity with gauze packs. After evacuating the uterus, unite its walls with four interrupted sutures of Pagenstecher thread, finest size; unite the myometrium with a double tier suture of chromicized gut, and the perimetrium with a double lace suture of catgut. Return the uterus to the abdominal cavity after the uterine operation is concluded and a toilet is made. If this technique is followed, Cesarean section is a comparatively safe operation at any stage of labor. In cases, however, of bad infection, such as those with gangrene of the vulva or sloughing of the vagina, the Porro operation can be done in the same way outside the abdominal cavity.

[1] The number has been increased to 80 since the above was written.

INTRAPELVIC *VERSUS* ABDOMINAL METHOD OF DEALING WITH MECHANICAL OBSTRUCTION TO DELIVERY IN CASES OF CONFINEMENT.

By Egbert H. Grandin, M.D.,
New York.

Mechanical obstruction to delivery may be offered: (1) By the pelvis; (2) by tumors in the lower uterine segment or of the vagina; (3) by the presenting fetal part; (4) by the cervix of the uterus.

I take it that for the purpose of this discussion, description of operative technique is uncalled for, and that we are viewing the woman only at the stage when induced labor with viable child still enters as a factor.

1. *Mechanical Obstruction Due to the Pelvis.* I shall eliminate from this discussion at once instances of absolute pelvic contraction. Here, from the very nature of the problem, the suprapubic method alone enters into the question, unless embryotomy be elected. In lesser degrees of contraction, of no matter which type, induced labor should be the operation of election. The rule I have laid down for myself is a simple one: Just as long as under suprapubic pressure the presenting part can be made to accommodate itself to the pelvic brim, just so long may we refrain from interference. When accommodation begins to fail, then, after one or another fashion, labor should be induced, irrespective of the fact that prematurity of the child is against its survival. This rule is

for me an absolute one, unless the parents elect a major operation at term. Where the case is not seen until the time for the rational induction of premature labor has passed, that is to say, the presenting part cannot be made to enter the pelvic brim, the choice lies between forceps, version, and the abdominal Cesarean section. There are here a number of factors which control our choice of method. *Ideally*, the Cesarean section, before the onset of labor or just after, should be elected. Such election, however, in private practice, is alone possible where the consent of the man and the woman is secured. The glamor surrounding the statistical data offered by individual operators should not blind us to the fact that all women cannot control the services of the expert. My rule is, if the Cesarean section is declined, to calmly await the advent of labor, and, when the proper conditions are present, to perform an elective version. My experience has taught me that when, under the natural efforts, the presenting head does not engage, it is safer for the maternal parts and less dangerous to fetal life to deliver by the more readily mouldable after-coming head than to drag the before-coming head through by forceps.

And this leads me to state, in brief, my views in reference to this instrument. *High* forceps, that is to say, where the fetal head is not engaged, I look upon as one of the major obstetric operations. I say this even though, with the aid of the only type of forceps I admit under this condition—the axis traction—I have been enabled, by means of careful and protracted intermittent traction, to deliver without extreme injury to the maternal parts. Where the head has engaged, by its greater segment, a condition which I am not considering now, we cannot longer speak of as high forceps. This is *median* forceps, an entirely different proposition. The version having been accomplished, where delivery falls, if the fetus is still alive and consent of the parents is secured, I find a field for symphyseotomy, since the alternative is

embryotomy. Even so, basiotripsy of the after-coming head carries less risk of injury to the woman than perforation of the before-coming head unengaged at the brim. Heboste-otomy, in view of the lesions suffered by the woman—and all who have read recent American literature will agree with me that they are little short of damnable—I unhesitatingly reject. Where the presenting part of the fetus is other than the head, considerations offer which will best be noted under the subdivision relating to the fetus. Under the present subdivision neither the Dührssen operation nor the vaginal Cesarean section claim consideration.

2. *Mechanical Obstruction Due to Tumors in the Lower Uterine Segment or Occluding the Vagina.* This phase I shall not dwell upon in extenso, since the time limit imposed on the discussion does not permit. Broadly, it holds that tumors of the vagina and tumors of the cervix and impacted degenerated growths should be removed by the vagina and then the condition of the pregnant uterus and its contents should be met according to the indication. Tumors of the lower uterine segment admit of but one course, and this the abdominal route, and hysterectomy or enucleation with Cesarean section according to indication. Pelvic tumors, solid or fluid, not degenerated, call for abdominal section, removal, and the Cesarean section. These general rules will not suffer modification, whether the pelvis or the fetus offers abnormality or not. The rules applicable to such abnormalities, irrespective of the presence of tumor, are to be enforced

3. *Mechanical Obstruction Due to the Fetus.* Here we face the problem which carries greatest difficulty in solution, for the simple reason that when the presentation is normal we are not in a position of estimating with accuracy the size of the head, and, further still, in fat women, the position. Very commonly careful pelvic mensuration and internal manual examination simply lull us to sleep, for at labor we find that,

although the pelvis is normal, the presenting part is the reverse. I have stated before my preference for version and my objections to high forceps, and as regards the latter, I wish to further say that whenever under the influence of well-directed uterine efforts the head does not engage, I am opposed to tentative forceps traction. *They teach us nothing more than Nature has already taught us.* Where the conditions for version are failing—that is to say, head above the brim or slightly engaged and movable and membranes unruptured—in preference to forced version I would advise symphyseotomy. Let me repeat, that here again I repudiate hebosteotomy. In the event of the pelvis being abnormal, with complicating excess in size of the fetal head, when satisfied that the mechanical problem is such that this head cannot enter the brim, the consent of husband and wife should be secured and an abdominal Cesarean section performed, the child, of course, being viable and alive, and the physical condition of the woman not contra-indicating. In these instances, obviously, neither the Dührssen operation nor the vaginal Cesarean section enter as factors. When the presentation is other than the head, and the dystocia is simply due to the malpresentation, the ordinary rules of obstetric procedure apply. When, in addition to the malpresentation there exists pelvic contraction, our choice of method for delivery should be again the abdominal Cesarean section, other things being equal.

Under this heading, as under the previous, I have refrained from dwelling upon types of deformity, and entering into consideration of pelvic measurements, since the time limit only permits of the expression of general deductions.

4. *Mechanical Obstruction Depending upon the Cervix.* Here we approach a phase where opinions are greatly divided and where such differences are to be expected. The conditions calling for interference and at times demanding rapid delivery are the toxemias, and, broadly speaking, the hemor-

rhages. It is not so much a question of fetus and woman as it oftentimes is of woman alone. Primarily, neither forceps nor version enter into the question, nor, as I shall contend, is it a question of the abdominal Cesarean section, except we are also facing a decided grade of pelvic contraction, the time suitable for the induction of premature labor for the sake of the child having been passed. We have reached the phase of the proposition where the Dührssen operation and the vaginal Cesarean section enter the field.

First, as regards the toxemias. Under this generic term I include the morbid phenomena emanating from kidney, liver, intestinal canal, and, hypothetically, the fetus. The type of operation selected will not depend so much on the variety of toxemia uppermost as on the degree and the imminence of fatal symptoms. I take it that we are all fairly well in accord that, when the time for surgery comes, the kind demanded is that which will enable us to empty the uterus or fetus within as short a time as is possible, paying due regard to the integrity of the maternal parts. I take it also that we are all agreed that the tendency of the average man is to wait too long before resorting to interference. These premises being granted, let us look at this topic from the standpoints of impending risk to the woman, and sudden present risk. Where clinical tests teach us that the toxemia is deepening, as a rule there is sufficient time limit to enable us to dispense with either the Dührssen operation or the vaginal Cesarean section. Here the mechanically obstructing cervix requires simply the attention I have been harping upon most of my professional life—gauze packing to cause it to soften and to merge into the lower uterine segment, followed by manual dilatation and delivery. At any time after merging of the cervix, where greater rapidity of operating is demanded than the hand yields, the Dührssen operation finds its legitimate field.

When, on the contrary, the toxic symptoms are of high

grade, then the vaginal Cesarean section enters most beneficently. I cannot conceive in the absence of pelvic contraction sufficient to rule out these pelvic procedures, of the abdominal Cesarean section ever being justifiable in face of the toxemias.

Next, as regards the hemorrhages complicated by dystocia due to the cervix. Concealed hemorrhage, as soon as diagnosis is reached, calls for immediate emptying of the uterus. Here, then, when the vaginal portion of the cevix has disappeared, the Dührssen operation offers, otherwise a rapid vaginal Cesarean section. Slower methods will not answer, since the woman's life is at stake.

The hemorrhage of placenta previa may be viewed more philosophically. When high-grade pelvic contraction does not complicate, I cannot grant that the abdominal Cesarean section is ever allowable. When the time element permits I still plead for gauze packing, to secure softening and merging of the cervix, followed by manual dilatation and delivery. Rarely, very rarely in my experience, will the case offer such urgency as to demand other procedure. The vaginal portion of the cervix having disappeared, a rigid lower segment may demand the Dührssen incisions. As regards the vaginal Cesarean section, I can simply state that I have never seen a case of placenta previa where it was indicated. In any event I should look upon this as a very desperate procedure except in case of marginal insertion, and here the hemorrhage is never so profuse or the life of the subject in such danger as to demand it. It should be borne in mind that in case of central insertion, profuse hemorrhage carries well-nigh absolute fatality for the fetus, and that, therefore, the interests of the woman need alone, as a rule, be taken into account.

It will be noted that I reject, for the present, hebosteotomy as an alternate operation. I would state that my position is based on the American statistics, since I much prefer to

judge an operation from home data, knowing the caliber of home operators. From this standpoint I cannot concede that the statistics are as favorable as those offered for symphyseotomy by men of similar caliber. Taking expert American operators, the latter operation never yielded the untoward sequelæ which, up to date, the former has. For proof of this assertion I need only refer you to the paper presented to this Society at its meeting in 1907 by Henry D. Fry. Neither of these operations can become elective, and when a narrow outlet is the cause of the dystocia, the child being alive, judged by their fruits, symphyseotomy must be preferred to hebosteotomy.

Such, briefly, are the opinions which I hold for the purpose of this discussion. Some are elementary and well established; others are open to criticism by those with different, probably equally well-founded experience. There are certain general deductions I wish specifically to establish: First, I am in hearty accord with the modern tendency of widening the sphere of the elective Cesarean section; second, I do not believe that either symphyseotomy or hebosteotomy can ever be made operations of election, and that, when either is demanded, the first should be given the preference; third, as I view an experience of nearly thirty years, I am glad Nature may now rarely cause me to destroy the living child.

DISCUSSION ON THE PAPERS OF DRS. NORRIS, REYNOLDS, GRANDIN, HIRST, AND SMITH.

Dr. Edward P. Davis.—There is one point which is of common interest and which has met with practically a common treatment, and that refers to prelabor examination or an examination of the woman before labor develops. Although all the gentlemen who have read papers have agreed upon the necessity of that one point, and while I

fully agree in that I must utter a word of warning as to the fact that it cannot at the present state of our knowledge be accurate, and that we must not assign too much importance to the results of that examination. I believe in it fully, but we cannot depend absolutely upon it. There is a large element of chance which can only be cleared up by the actual test of labor.

Proceeding to our patients we may divide them into private patients, married patients in their own houses, and patients who come to us in hospitals. In the first class, those of married persons living in their own houses, a preliminary examination before labor should lead to consultation with husband and wife, or if the husband be not living, with the nearest responsible relative. The result of this consultation should be that the operator should lay before these persons frankly, as well as he can, the dangers to be avoided, and should give the person, the husband and wife, or family, the results of modern methods, and especially the results of his personal work, and then say to them, What value will you place upon the life of the unborn child? We do not desire to place the mother at unnecessary risk, but it must be acknowledged that intrapelvic delivery offers a greater risk to the fetus by the induction of labor through successive days, and that delivery by the elective Cesarean section offers to the child lesser risk than any other method. If, then, the mother is willing to consider the question of elective Cesarean section as contrasted with intrapelvic delivery, in view of her desire for a child, she should have that privilege, and I have been led to that conclusion from actual experience with private patients. I have had a woman request Cesarean section, and I have declined the request and have delivered her three times successfully by the induction of labor and use of forceps, and I have put the question before the husband and wife and had on two occasions Cesarean section requested: one after a consultation with Dr. Hirst, and in the other case the family assumed entire responsibility. In both cases, the induction of labor and Cesarean section, the results were perfectly satisfactory, there being no mortality and no morbidity. That, I believe, places our science upon a fair and dignified stand, in recognizing the right of the husband and wife.

Coming now to hospital cases, we have a different situation. It has been abundantly proved in the hospitals of Germany that if the mother be asked whether any consideration shall be placed on the child she will say no, except in those rare cases where she may be a married woman who has lost children in previous labors and desires offspring. I do not wish to convey the idea that German mothers are less loving than American mothers, but the unmarried woman will always avoid risk to herself at the expense of the child. The surgeon must be the arbiter in the case. He cannot suggest Cesarean section or pubiotomy to a young girl and expect acquiescence. She will demand that the child be destroyed. When we consider the extraordinary possibility of labor in a young primipara with elastic tissues, and the further fact that the unborn fetus is a potential factor and may, when delivered with care, be brought to better development in after-life, we may allow this woman to go into the test of actual labor.

I wish to call attention to what seems to me a most serious objection to these skilful and successful methods of artificial dilatation of the cervix. They very often alter the mechanism of labor. They further do away with the moulding of the fetal head to a considerable extent, and is it not a fact that one of the most valuable methods and criteria for estimating the possible delivery of a child through the pelvis is the moulding of the fetal head! If, now, we shorten by artificial dilatation the labor at the period of moulding, followed by immediate application of forceps, shall we not have an increased fetal morbidity and mortality, and shall we not have an increased risk to the mother by reason of the abnormality in the labor? The test of labor does away with that, and after a fair amount of labor pain the woman gives a practical demonstration of the fact that she can or cannot be entrusted to bring the head of the fetus into the pelvic cavity, whence it can be readily removed. Here I am quite in accord with Dr. Hirst in this fact, that the mortality of the Cesarean operation after the woman has been some time in labor need not be high. I have had forty-three Cesarean section operations upon women who had not been subjected to forceps or version, but who had been for some time in labor, and in some of these women labor was induced by

myself with the hope of avoiding section. In this number of operations there was one maternal death, but no fetal mortality.

So far as the question of induction of labor is concerned, there can be no doubt as to its lessened maternal mortality; but the most ardent advocates give a fetal mortality of 10 per cent., the mortality ranging from 20 to 24 per cent. These are American statistics. With other statistics the mortality is even greater. When, therefore, the question of the life of the fetus be at all considered, these statistics must also be taken into account.

I desire also to call attention to this fact, that abdominal delivery is the only method of delivery which determines the future procreative power of the individual. There are cases where a married woman, who has lost children in difficult births, is willing to undergo an operation for one child, but cannot bring herself to further pregnancy, and with the assent of husband and wife is it not our duty to conduct labor in such a way that further procreation shall not occur?

Again, in the case of septic patients brought to us in a most desperate condition, where craniotomy has been tried with forceps and version and the woman infected, we have in abdominal delivery one safe method, the Porro operation. I have had seven of these desperate cases, some of them brought from the country on stretchers, and of that number four have recovered under the Porro operation and three have died. They have been neglected and much maltreated women, and that is a fair showing under the circumstances.

There is another point to which I desire to call attention (and I am glad we have with us today Professor Pfannenstiel, who is undoubtedly familiar with the operation), and that is the suprasymphyseal Cesarean operation. There is an interesting case recently reported in the *Centralblatt f. Gynäkologie*, with some injury to the bladder, which brings up the question of avoiding injuries to the bladder. The suprasymphyseal operation consists in avoiding the opening of the peritoneal cavity. I believe Professor Pfannenstiel has done the operation. Sellheim has had five cases. If you will look in old American literature, about 1850, you will find a paper the author of which suggests that women be delivered by a Cesarean operation or by a transverse supra-

pubic incision, pushing up the bladder and avoiding the peritoneal cavity. This was drawn to my attention by one of my students when lecturing on this subject.

Professor J. Pfannenstiel.—If I understood Dr. Davis rightly, he spoke about having license to do these operations. That is very essential and important. According to our law we must not perform an operation which is not allowed, but nearly always we get the license to do so. Usually we get this license by persuasion, and are protected.

As our time is limited I will restrict my remarks to the consideration of one or two points. It seems to me that hebosteotomy or pubiotomy is not considered in as favorable a light in this country as it is in Germany. Speaking for myself, I am not only an advocate of hebosteotomy, but I likewise give Cesarean section and the induction of premature labor their respective places. I think all of these operations have their special indications. In some instances we cannot say definitely that it is better to perform Cesarean section or to do hebosteotomy. We must try to differentiate the cases and perform that operation which is indicated in the individual case. I teach students all these different methods. One method is not taught to the exclusion of others. My students are trained to do Cesarean section, to perform hebosteotomy, and to resort to the induction of premature labor. It must be remembered, however, that these operations are to be done by specialists and in hospital cases. Generally speaking, Cesarean section is done for greatly contracted pelvis, and hebosteotomy and the induction of labor for minor degrees of contracted pelvis. The relation between the infant child and the pelvis of the mother gives the special indication.

I read a paper before the Chicago Medical Society not long since in regard to my method of hebosteotomy. I am going to Chicago from this meeting to read a paper before the American Medical Association on Cesarean section, and if any of you are interested you will find my results and my special methods given in those papers.

Dr. Henry D. Fry.—In a large number of women who enter the hospitals in Washington, especially a large number of colored women, the conditions are such that we find small pelves in a large proportion of cases. In nearly one-half

of the white women and in over one-half of the colored women the external measurements are below normal. Generally contracted pelves exist in 49 per cent. of all colored women and in 25 per cent. of white women, whereas the measurements which would indicate simply contracted pelves give a percentage of 20 in the white and only 5 in colored. Thus, we have a large number of generally contracted pelves, especially in colored women. Fully two-thirds of these cases are delivered naturally. In a large number of cases, where the external measurements would still indicate diminished pelvic space, the diameter of the conjugate will be found normal. Nature takes care of these women with contracted pelves because they have small babies, and in proportion to the decrease in the size of the conjugate the babies get smaller and smaller. In some 400 examinations, where the external conjugate measured between 19 and 20 cm., the babies weighed seven pounds and ten ounces and gradually got smaller and smaller as the external conjugate diminished, and when we got down to an external conjugate diameter of between 16 and 17 cm., the weight of the babies was six pounds and four ounces. A large number of them, fully two-thirds I should say, are delivered spontaneously.

At the Columbia Hospital, where we had a number of these cases until recently, high forceps was used a great deal. The maternal mortality was almost nil; but we have lost one-third of the babies. In the last twenty high-forceps operations there being seven dead babies. In these cases we have begun to use now the elective Cesarean section, and out of sixteen babies viable fifteen were born alive. The mortality has been almost practically nil.

The induction of premature labor is receiving less and less attention with me personally. This spring I tried it on two cases, with failure in both. In one I made a mistake in the date of the pregnancy. The woman had given birth before to two dead babies. In the other case the woman entered my office and on examination she was found to have a contracted pelvis. About the end of the thirty-second week the head was pushed into the inlet. I got her up to the thirty-sixth week and tried to induce premature labor. The child weighed ten and one-quarter pounds, and the

presentation was occipitoposterior. Labor was induced between the thirty-sixth and thirty-seventh weeks. I could not succeed in rectifying the position of the head. Accordingly I brought down the head into the pelvic cavity with forceps, and could not get it any farther. In that case I heard fetal heart sounds distinctly. I did not do a craniotomy, but a symphyseotomy and delivered the child. The woman made a perfect convalescence, and walked well after operation. Considering the high mortality of children from premature labor, and the fact that the maternal mortality is almost as high from the induction of labor as it is in the elective Cesarean section, I would consider that as favoring section. High-forceps operation and version, I believe, is obsolete practically.

I am very glad that Dr. Smith is a convert to Cesarean section. A year ago, when writing for information on these points, he told me he advised high-forceps operation. He had a long Baudelocque forceps, and said he had one case where labor went on furiously, and within twenty-four hours the head was not engaged and he delivered the child with that instrument. Since that time he has been converted to Cesarean section in preference to high forceps. High forceps, with disengaged head, is obsolete.

I was very sorry to hear Dr. Grandin's remarks with reference to version. The mortality to the child after version is very great. If one performs version and the head does not engage, there is nothing left but a destructive operation or the question is narrowed down to Cesarean section, symphyseotomy, or pubiotomy. In the elective Cesarean section, under the absolute indications, of course, we are all agreed that it must be done.

In the border-line cases of contracted pelvis where it is difficult to determine what we must do, and where we let labor start hoping the fetal head will mould and the child be delivered successfully per vias naturales, if we get labor going on for several hours, and the head is not engaged, particularly the biparietal diameter, it is a case for Cesarean section, and my experience is it will be successful in the majority of cases. Even if labor has been in progress twenty-four or thirty-six hours, if the case is treated in an aseptic way, very few examinations having been made, and

forceps not applied, you can do a Cesarean section. But I would not pack gauze in the vagina, as recommended by Dr. Hirst. We know how difficult it is to keep the vagina sterile. Even the introduction of a speculum may carry in germs from the vulva, and so I would omit packing the vagina with sterile gauze; simply conduct the labor in an aseptic way; if you find you cannot deliver the child naturally, then do abdominal Cesarean section.

In regard to symphyseotomy and pubiotomy it seems to me a great many obstetricians have given them a black eye, believing they have very little place. I cannot share in that belief, as I believe there is a place for both of these operations. Let us suppose you are called to see a case after some doctor has used forceps and probably the woman is infected. She has been in labor a number of hours. Now you cannot do Cesarean section, and you do not want to do a craniotomy, because the heart sounds of the child are distinct. There is nothing left to do but symphyseotomy or pubiotomy, and I believe there is a field for these operations in these neglected cases where we do not want to do Cesarean section, and I believe the thing to do is a symphyseotomy and save the child. As regards the dangers attending symphyseotomy and pubiotomy, there is probably a little less danger from the wounding of the bladder or urethra from pubiotomy. There is probably a little more hemorrhage. The operation is easier to perform. The objection to either one of them is a troublesome convalescence, septic phlebitis that complicates these cases, edema of the vulva, etc.

Dr. Charles Jewett.—The principal objection urged against premature labor is the high fetal mortality. But its opponents make little or no distinction between different degrees of prematurity. In cases in which the woman can be delivered in the last two or three weeks of pregnancy, the results to the child by induced labor are better than by disjunction of the pelvic ring, almost as good as by Cesarean section, and they are better for the mother.

I am in sympathy with those who have at least partially condemned the pelviotomies. The after-care is extremely unsatisfactory, the degree of traumatism great, and the after-condition of the mother frequently is bad. These operations do not deliver: they only prepare the way. Two

and often three operations are required for delivery—dilatation of the birth canal and extraction by forceps or version as well as the pubic section. I grant that section of the pelvic ring may have a certain indication in cases in which during labor it is necessary to get a little more pelvic space for delivering a living child, but in which the woman's condition forbids Cesarean section.

As between the two operations, symphyseotomy and pubiotomy, there is very little choice. It is claimed that the danger of infection is less in cutting through the bone than in dividing the interpubic disk, but this advantage is counterbalanced by the great frequency with which pubiotomy patients get crural phlebitis. Crural phlebitis occurs more commonly after this than after any other operation.

It is claimed, too, that the danger of injury to the bladder is less in lateral than in median section. Yet in dividing the bone the saw must be used within the field in which the bladder ligaments lie. But most of the injuries to the anterior soft parts occur from the stretching which these structures are subjected during the passage of the head, and there can be very little difference between the two operations in the overstrain upon the soft parts. Either of these operations, I believe, must have a small and a steadily narrowing field in the future.

Dr. August Martin.—I have listened to this series of papers with great interest, and wish to say that if we follow the development of these various operations for delivering women, we shall see with Max Sänger that the classic Cesarean section operation is limited to a small number of indications. When Morisani revived symphyseotomy, it was energetically defended by French collaborators, by Schauta, Zweifel, and others. The results of symphyseotomy alone were not as satisfactory as they might be, and then Professor Gigli advocated symphyseotomy and pubiotomy. All of these operations have been advocated according to the indications to save living children from perforation, but it must be remembered that these operations were proposed for aseptic cases, whereas in septic cases and in greatly contracted pelves, perforation was practised. Not long since Frank, of Cologne, proposed another kind of abdominal incision, with a view to saving the peritoneum, which

incision has been modified by Sellheim, who proposes to open above the symphysis and take off the peritoneum of the bladder, separating the bladder downward from the cervix uteri and incising it in the median line without, in many instances, incising the corpus uteri. If I am able to see the course of these various operations, I feel that sooner or later we shall return to the classic Cesarean operation and direct our attention toward finding out a method of saving the peritoneum.

With reference to symphyseotomy and hebosteotomy, referred to by Professor Pfannenstiel, they are more difficult and require great skill on the part of the operator and should not be undertaken by the average general practitioner in the country.

Dr. Edwin B. Cragin.—I would like to say a word in favor of the induction of premature labor. There has been a tendency lately to decry it, and yet I confess I should not know how to practise obstetrics in New York unless I could avail myself of the induction of labor in the minor grades of contracted pelvis. As to Cesarean section, I believe in the test of labor. Except in cases where the indication is absolute I do not believe in doing Cesarean section until Nature has shown what she can do with the fetal head, and in cases in which Nature has almost succeeded with the help of the accoucheur it seems to me that at the subsequent labor the induction of premature labor at two or three weeks ahead of term would probably solve the problem successfully.

In regard to Cesarean section after a trial of labor, I must confess I am averse to using bags in the cervix and in the vagina. If I am to perform Cesarean section, I want the cervix and vagina as untouched as possible. I want the vulva thoroughly sterilized and kept covered with a sterile dressing, and, therefore, I feel uneasy if obliged to do a Cesarean section after I have had an elastic bag in the cervix and vagina. I am not afraid, with a sterile dressing on the vulva, and with labor carefully conducted, to perform a Cesarean section after several hours of labor.

I want to say a word or two in regard to vaginal Cesarean section. I have done quite a number of them, and yet the operation impresses me as not being an easy one. I do

not know how it is with other members of this Society, but the upper angle of the uterine wound, in my experience, is not always easy to close. The ease with which one does an abdominal Cesarean section, with everything before his eyes, contrasted with vaginal Cesarean section, with the upper angle of the uterine wound hard to reach, does not speak, in my experience, in favor of vaginal Cesarean section. However, there is a field for it, especially in the toxemias where the cervix is rigid and long, and where we have difficulty in dilating with fingers or bags, yet I would emphasize the one point that it is not always an easy operation, and it is not an operation that compares favorably, in my judgment, with abdominal Cesarean section.

In regard to pubiotomy and symphyseotomy, my feeling corresponds closely with that of Dr. Jewett. Admitting that there may be a narrow field for these operations, I believe it is extremely narrow and will grow narrower and narrower as the years go by.

Dr. Robert A. Murray.—I only want to bring into prominence two or three points that have been mentioned, and especially to talk about one point in regard to the teaching of obstetrics. Most of our statistics of the major operations have been gathered in hospitals. The majority of patients are not confined in hospitals, but outside of them. I was very glad Dr. Davis brought that point forward. There is a difference between a patient at a private house and one in a hospital. The patient in a private house is under our care during the pregnancy, and she is brought to the physician before confinement, when she can be under our observation and we can determine as to the condition of toxemia by an analysis of the urine, and why should we not absolutely determine the condition of the pelvis? We should, and the fault in a hospital is that we do not have an opportunity to do this in the large majority of cases, so we have the choice of only two operations in cases of faulty pelvis, Cesarean section, and premature delivery. I think that in the eighth month or before it, when observation is made to determine about toxemia, we should absolutely determine whether the fetal head is compressible into the pelvis, and what degree of solidity there is in the suture (the size and shape of the pelvis, the relation of the child's

head to the pelvis). Next, I believe that with skilled assistants, and with the skill which the members of this Society have, Cesarean section to the surgeon is preferable to any other method of delivery. It is the easiest. It is easier than many normal labors. It means less care on the part of the surgeon. It means less time. I would make a plea for version and forceps in the third stage, as both of them have stood us well in the past and with men who are educated, as they should be, in the employment of these measures, and for the general practitioner, who is to confine his patient in a private house, it would be a fearful mistake for us to say: Leave the case alone, do not try version or forceps because Cesarean section is easier. It is easier to us when we have all the paraphernalia and facilities of a hospital with which to do it. It is not easier when done at a private house very often, and if we were to consider our relatives in such instances we would not like to have the abdomen opened if there were a possibility of delivery of the child by the natural passages.

I believe there is a field, and a very big field, for the induction of premature labor, and there is a large field for the improvement of the nutrition of the mother and child during the time of pregnancy to prevent Cesarean section. I think Cesarean section will hold as in the past in primiparæ on account of their age or owing to their contracted pelves and where the pelvic bones are absolutely fixed. I do not think in these cases pubiotomy or any operation on the pubis would be as effectual as Cesarean section, but we can control to a great extent the child's head, and we can induce premature labor and by version and forceps do good work, and not pull away the vagina from the bladder and do other damage, as has been done in the past as the result of using high forceps. Still, I would put on high forceps, as Dr. Grandin has pointed out, in advance of doing Cesarean section or any other operation, but good judgment is necessary to determine when it should be done. There are very few men who have the skill in midwifery to say absolutely they can take a child through the pelvis when they cannot absolutely determine its size. In such a case, if the patient is in position to have Cesarean section done, I believe it is far easier; but there are certain conditions in which we have

to do the operation, where the waters have been broken for a long time where the child's heart is beating but slightly, and where it would be a mistake not to try that operation.

As regards the test of labor we should give these patients the test of labor, but do it at a time before the child has a firmly ossified head, say about four weeks before labor should naturally come on. At this time I think we can do version and apply forceps with compression of the fetal head. Many a time I have seen the head come through in a very slight forceps operation or none at all, whereas in a hospital the chances are a Cesarean section would have been done.

Dr. Malcolm McLean.—In listening to this discussion it seems to me that there is one point that ought to be referred to which is not perhaps strictly on a scientific basis, but which is a practical one in the practice of obstetrics, and that is the impatience of the age. In this country—I do not know how it is in Germany—things must be done in a hurry. A woman must have a baby within a few hours. She must not go through the normal changes that are requisite to conduct her through a normal delivery, and we as teachers—for I take it this great Association stands for the correct teaching of obstetrics—must bear in mind the great number of practitioners of obstetrics today who are making mistakes and bringing ill-repute upon such operations as have stood well by scientific men, such operations as the application of forceps in proper cases, version in proper cases. I say that a great number of obstetricians are bringing into ill-repute operations that have stood well in the past, because of their imperfect training and imperfect putting into practice of principles taught them in medical schools. Young men are being taught to use the forceps in cases and under conditions that are totally improper and contrary to all the teaching done by the members of this Association.

Only a week ago I had my attention called to the case of a primipara with normal pelvis, with right occipito-posterior presentation, in whom forceps was applied and traction was made with great violence. In this case, as Dr. Smith pointed out in speaking of another instance, there were two people holding the patient down; the operator was not strong enough to make traction, so they sent for a next-door neighbor, a layman, to help pull. This man

was of an inventive turn of mind; he brought in a piece of clothesline, hitched it to the handle of the forceps to help to make traction in that way. One can hardly conceive of such things being done in a civilized country in large cities, and yet it is nevertheless true. We should direct all our energies toward getting a correct foundation in teaching obstetrics, and then we can afford to talk about these major operations more in detail. I know I am not speaking to the subject, Mr. President, and am avoiding the points which are necessary to bear upon the operations which have been referred to; yet we should remember that the violation of propriety in these operations is still going on, and as a result statistics as they stand today are against the normal operation by forceps or by version. It would be difficult to convince me that version should be laid aside when I have had at least fifty cases that I have carried through in that manner without any mortality whatever except in one case. I would plead, therefore, for the sustenance of normal operations through the normal passages, as far as possible. Then comes the question: What operation shall be substituted, if these are improper, in a given case? I think by proper mensuration of the pelvis and of the child's head, and it can only be approximately exact, we can ascertain whether either of the operations I have mentioned is applicable. If neither, then both should be rejected, and for my part I should, in preference to severing the pubic bone, resort to the classical Cesarean section.

Dr. Charles M. Green.—I sympathize with Dr. McLean in his remarks. It would almost seem from the discussion that the high-forceps operations and podalic version have been forgotten in dealing with cases of relative disproportion; and that Cesarean section has become such a safe operation that it has supplanted the older methods. Speaking for my own school and hospital, however, I would say that we take a good deal of pains in teaching the technique of the forceps operations and of podalic version, and the indications for their most appropriate use. We try also to teach the best methods of antepartum examination, pelvimetry, estimation of the size of the fetus, and due consideration of the history of previous labors.

We all know that there are three factors in the passage of

the child through the pelvis. It is not alone the passenger; it is not alone the passage; we have yet to consider the power that is to push the passenger through the passage, and what this power will prove to be in any given case it is often impossible to predict. In multiparous women we may know what the powers have proved to be in former labors, and what have been the results of former operative procedures. With a history of previous obstetric disaster in attempted delivery through the pelvis by competent skill, it is easy to decide on abdominal section, and wiser and safer to perform it, if possible, without subjecting the woman to the test of labor or the risk of vaginal examinations.

In primigravidæ we can only estimate the probable vis a tergo in labor by our judgment of the woman's general strength, and this usually is a doubtful criterion. If, therefore, there is a marked disproportion between pelvis and fetal head, and if there is not a reasonable probability of safe delivery by the pelvic route, the indication is clear for an elective Cesarean operation, performed preferably before the incidence of labor. I may say in passing that the experience of the Boston Lying-in Hospital has convinced its present staff of the inadvisability of the induction of premature labor in such cases. Since we have practically discarded this procedure and have resorted to the elective antepartum Cesarean operation, our ultimate results have been incomparably better.

If in the untried pelvis of a primigravida, on the other hand, the relative disproportion is not marked, and especially if she has had proper supervision during pregnancy and is brought to her best physical condition, I believe in subjecting her to the test of labor for a reasonable time, carefully abstaining from vaginal examinations, and then if satisfactory progress has not been made in the engagement of the head, to proceed to the Cesarean operation. We do not believe, and I think I voice the opinion of my present hospital associates, in symphyseotomy and pubiotomy. We think we do better in delivering by abdominal section, if the pelvis is too small or the child too large. In the late cases seen in consultation and hospital practice, in which the Cesarean operation is no longer safe, the fetus is often dead or in such a feeble condition that its chance

of living is too small to warrant subjecting the mother to the dreadful convalescence from either symphyseotomy or pubiotomy, or to the not infrequent disabilities consequent on these operations. In such late cases it is far wiser and more humane in my judgment to perform embryotomy, if necessary, without maternal risks, expecting to deal earlier and more successfully with subsequent labors.

Something yet remains to be said in regard to the management of cases in which there are minor degrees of relative disproportion. And I was glad to hear Dr. McLean speak, because I think what he said might well be conveyed to a good many young men in the profession, and to a good many medical students. Considering the almost universal American habit of haste, the belief that everything must be done in a minute, it is a question whether the present generation have an adequate conception of the process of labor. I have seen primiparous cases in which, if the woman is not delivered within twenty-four hours, the hand of the physician is held up in amazement; he and the friends agree with Mrs. Harrington, whose house adjoined Lexington Common, and who exclaimed when she learned that the British regulars were marching on the town, "Something has got to be done!" Twenty-four hours may seem a long time, of course, if a woman is suffering all that time; but under modern methods she can be kept from suffering severely. Scopolamine-morphine anesthesia works well in many of these cases; and woman may thereby have rest and sleep without arrest of physiological labor. Moreover, a woman in labor should be fed. A hungry soldier cannot march and fight as well as when seasonably fed; neither can a woman labor successfully when long hours pass without proper nourishment. I have seen women delivered of healthy children and make good convalescences after forty-eight hours of properly managed physiological labor. I would certainly plead for a more careful study of the physiology of labor, and for a better knowledge of the management of pregnant and parturient women. If a woman with a minor relative disproportion is not naturally strong, cannot be made stronger by judicious care before and during labor, and operative assistance is necessary after reasonable effort, let us not throw aside the experience of past generations

in the successful use of what are often called the minor operations, but which, however, certainly call for great skill —the old-fashioned podalic version and the use of high forceps, with or without axis traction. And let us not be too ready to resort to Cesarean section or pubiotomy on the doubtful estimate of her physiological power made during pregnancy or very early in labor.

After all is said we may all surely agree that a wise decision as to the best method of procedure in any case of dystocia calls for the exercise of a quality which contributes to professional success far more than knowledge—the exercise of a well-trained judgment.

Dr. E. W. Cushing.—There is one point to which I wish to call attention, and that is where a woman is brought into a hospital, presumably infected, the child alive, and it is a question of doing Cesarean section, that much good may be derived from the intelligent use of vaccines as now prepared. For instance, in my hospital several months ago a case was brought in which had been worked over by five doctors for twelve hours, forceps having been applied with rudimentary precautions or none at all, and rather than lose the child the attendant performed Cesarean section. At the same time Dr. Leary took a culture from the cervix uteri. The woman had a terrible chill and a temperature of 105°. One would have thought she was going to die. The culture was bred and found to contain colon bacilli. There were no streptococci. Vaccines made from the colon bacilli were given, and the temperature declined and the woman recovered. I believe her recovery was largely due to the giving of the vaccines.

I could mention numerous cases where Cesarean section was not necessary, and similar occurrences have taken place where children have been finally delivered with forceps and the temperature of the mothers controlled by the use of vaccines, the women going on and making good recoveries.

Dr. A. Lapthorn Smith.—This discussion has been most instructive to me, and I have listened to it with pleasure and interest. I want to refer to a few points, one of which was raised by Dr. Davis, namely, that we should try to get these women to come to us at the end of seven months and have premature delivery effected. I have tried that many times,

but I find that these women soon forget their past troubles and will not come. I have tried to get them to diet themselves in order to have small babies, and this has failed in the same way. In spite of instruction and caution, they seem to get fatter and fatter, and their subsequent babies bigger and bigger.

Next I want to protest against consulting the woman or even asking the husband what they want you to do. The fact of the matter is that when a woman is in labor, particularly if it is one that is likely to require Cesarean section, she is not in a condition or position to say what is to be done; neither is the husband; neither is the family physician in a position to do so. That is why he calls us experts in. We must decide ourselves, and that is the position we should take. It is a mistake to lay such a matter before a layman who does not know anything about it. It is hard enough for us to decide ourselves, possibly with the help of confrères, if necessary. But we are the ones who must shoulder the responsibility. If we believe that Cesarean section has no mortality for either mother or child, which I am sure I can predict will be the case five years hence, then people must leave us to do it when we think it is necessary.

Dr. Davis also said that when a woman has once had a Cesarean section done, she will dread it so much that she will never become pregnant again. That is not my experience. Both of my patients said to me, "Doctor, I want you to open my abdomen next time." I recall one of my cases who had lost her first two children by craniotomy. Of the next two, one died after a high-forceps operation and the other is living. Then she had one small baby which was delivered by a natural labor, and the sixth one I worked with one hour with high forceps, and as I could not get the head engaged, I opened the abdomen, extracted the child, and the woman made a good recovery. She said to me, "I am willing to have a baby every year if you will promise to do Cesarean section without putting me through the ordeal of forceps." This I promised.

In another case attended with puerperal convulsions the woman was in no condition to say what should be done. In this case I resorted to Cesarean section rather than to

an accouchement forcé, because I know the latter operation is very dangerous to both mother and child, and it was impossible to do it without great risk. She also said she would gladly have a baby next year if I would promise to do a Cesarean section, which of course I could not do, as it probably would not be necessary.

Dr. Egbert H. Grandin.—Just a few words, and, first, to correct a misapprehension which you may have gained because of my imperfect utterance. After Dr. Fry's remarks I wish to say that since I was one of the first in this country to plead for elective Cesarean section as against embryotomy, I am not saying I wish to do embryotomy, where the Catholic Church decides, and not the parents, I of course do Cesarean section. A second misapprehension is this: I am not saying that I would rather perform version than Cesarean section; I am contending simply that high forceps can never be made an operation of election, and that when cutting operations are refused by the parents, who have a right under the law of this land to elect, I prefer version. Thirdly, I do not know what kind of women live in Canada, but I wish we were able to do in the United States what it seems possible to do in Canada *always*—a Cesarean section. If this could be done we would get through in a hurry, and be able to go to bed. But that time will never come in the United States, and if it does obstetrics will become a lost art, and gynecology will have another star added to its crown. Perhaps!

Dr. Edward Reynolds.—I think our discussions of the last two years have been most profitable. As I have listened to the discussions today, it seems to me that the men who two years ago were widely divergent in their views, are today separated only by minor differences in individual opinion. I believe profoundly that the elective Cesarean section is likely in the future to take a more and more prominent place in our practice. I believe that we are very wise in going slowly. Of the doubtful cases that come to me for opinion, I think I have recommended against version for Cesarean section in about an even proportion of cases. I am far from believing that there is nothing in the induction of labor. I think there are doubtful cases where we are wise in not allowing pregnancy to go beyond, or perhaps quite to term

with soft heads which may become hard; but I believe profoundly that whether we are going to do intrapelvic or abdominal operations, the fight for the induction of labor at eight months or earlier, in cases of marked deformity of the pelvis, is a losing fight like the long continuous fight which we all remember for the extermination of cancer by the use of the galvanocautery as opposed to the knife. The early induction of labor in any but the most doubtful cases is a bygone expedient.

Dr. Norris (closing).—This has been a most interesting discussion, and I am glad to see that when such questions come before us, the common-sense of our Society reaches a safe and middle ground. I am satisfied that this discussion has been productive of good. The tendency which seems to exist of the thoughtless and overzealous application of the Cesarean operation in the hands of men less expert and possessing less judgment than ourselves, might reach a point which would be harmful to the general profession, and our discussions will check that tendency. I believe it has been brought out fairly well that we have not wholly abandoned the older ideas of obstetrics; that obstetrics is not in danger of losing itself as a specialty, and that gynecology, applying its surgical principles to our practice, will add new laurels to our victories. We seem to be in general agreement that in the minor grades of pelvic deformity the induction of labor has still a useful field; that where we approach those grades, in which the disproportion is threatening, Cesarean section is coming more and more to the front. Its limitations are being defined. The limitations of induced labor are being defined. The limitations of the application of forceps and of version are being defined, and it is by discussing in detail the limitations of each plan of treatment that our discussion will be most useful to the general practitioner.

I quite agree with Dr. Smith when he says that these problems cannot be settled by patients or the members of their family. We cannot expect, after reaching our own conclusion, that a certain plan of procedure is best, that the family will appreciate a technical argument on the subject. If the family disagrees with us, which almost never happens when the attendant has its entire confidence,

another attendant who may share the views must take the responsibility.

As to the relative advantages of pubiotomy and the elective Cesarean section, I am glad to agree with those gentlemen whose obstetric work has been more or less dominated by their large experience in abdominal surgery. Instinctively I feel safer in operating through the abdomen. Why is it the gentlemen abroad, especially the Germans, are studying pubiotomy? Is it because they are not satisfied with the results of Cesarean section? Why is it in this country we are antagonistic to it even as a matter of investigation? Is it because we think we are better abdominal surgeons and are satisfied with our results of Cesarean section? I cannot believe that contrast can exist. The status of pubiotomy should be a study with us as with them, and if we approach this subject from the standpoint of investigation, not from predilection or choice of operation because agreeable to ourselves, we will help to determine its status, which I believe will be of undoubted value to obstetrics. But its status must be determined. Its limitations must be defined, and how else can that be determined except by experimental work? You talk to the orthopedic surgeon about sawing bones, and it is attractive to him. It does not impress him as dangerous or difficult. He would prefer to do bone surgery. We are accustomed to enter the abdomen, preferring that route in which we have had the largest experience. While the duty devolves upon us to determine the limitation of pubiotomy, I think we should not reserve it as a measure of last resort in infected cases, as Dr. Fry has suggested, since the mortality in such cases is from 12.5 to 15 per cent., just about the same as the mortality of the late Cesarean section. It must be elective. It must be an operation of choice, and while my own personal experience amounts to very little I will say that in two instances the convalescence of the patients could not have been better following any operation. Their care during convalescence was not troublesome or unsatisfactory when a modified Bradford frame was used. Pain was not great. Delivery was easy, and the patients were up and about in a short time. The operation has a value which we as experts must determine, and we must learn not to

make it a last resort operation, but let it stand on the same plane as Cesarean section and win or lose by its merits, tested side by side under similar conditions. I am not averse to opening the abdomen. My gynecological experience is quite as large as my obstetrical, yet it seems strange to me that, in a hospital under my own care in this city, where the class of patients is that akin to private practice, where there is no ambulance system, where it is true there is a moderate amount of emergency work, it seems strange, I repeat, that it is possible for me to conduct that institution throughout fifteen years with its accumulated experience of three thousand labor cases as they happened to enter, that I have not once done Cesarean section. I believe that is not to my detriment, but rather to what I have chosen to feel is a wise selection of obstetric procedures. My mortality in cases of obstructed labor for the mother has been nil; my mortality for infants in those cases has been quite large, averaging 10 per cent. In a few of the cases, in the light of my present knowledge, I would now do pubiotomy or Cesarean section. Cesarean section is the operation of choice for the skilled gynecologist. Pubiotomy must be kept in the hands of the skilled obstetrician. I believe pubiotomy will have a place, but its limitations must be learned by us. This discussion has brought out the salient features, and among other things it has pointed out that our cases should be studied carefully before labor, and with the results of our accumulated experience applied to the treatment of individual cases we will find that the methods of obstetrics known to our fathers as useful will have a more restricted field, but cannot yet be abandoned to the extent recommended by some able men.

A GLANCE OVER THE DEVELOPMENT OF THE TECHNIQUE OF MODERN GYNECOLOGICAL OPERATIONS.

By August Martin, M.D.,
Berlin, Germany.

The honor of being able to address this meeting I appreciate the more as it has been my sincere desire since this Society conferred upon me its honorary membership in 1888. Some forty years I have been in close contact with my American confrères; at that time it was my good fortune to meet several of your most prominent representatives, Marion Sims, Emmet, and Gaillard Thomas. Since those years many more distinguished Americans have been added to this number. Twenty-one years have elapsed since my visit at the meeting in Washington, and that I am with you again today means that my greatest wish of the past years is to be fulfilled.

In this comparatively long period of time gynecology has experienced an unexpected and magnificent development. One could suppose, that along with the entire medical science, gynecology, too, would be subject to fundamental change. In view of this, we must gladly confess that every day discloses to us new and fascinating prospects. New perspectives loom up. Participating in the work of research, we feel urged to further collaboration; it is a pleasure to live and stand in the midst of this activity.

Nowhere does this fact become more evident than at our

society meetings, where, face to face, we give an account of our scientific doings, and in the most ardent manner take up the results of the research work of our collaborators. Such thoughts filled me as I received your call to be present at this meeting. Your program includes a number of very interesting contributions to the questions that are at the front today. I look forward with enthusiasm toward our transactions and am counting upon receiving much instruction.

In this connection, while glancing over the development made along the line of work during the past five decades, I became especially interested in finding out the various turns *gynecological treatment* has taken. Fifty years ago the work of the gynecologist was limited to medical and orthopedic applications to the vulva and vagina and the collum uteri. One was more or less timid about entering the cavity of the uterus. After Sir James Simpson and E. Martin had made the decision of the narrowed os uteri, an essential step forward was noted, as well as in the employment of the écraseur of Chassaignac and the use of the electric cautery. During this time also, especially after Atlee, Peaslee, Spencer-Wells, Baker-Brown, Koeberlé, and Keith had met with remarkably good results, abdominal neoplasms, being more exactly recognized, were attacked by laparotomy with more confidence. It was reserved for Marion Sims, however, as well as for Gustav Simon and Hegar to lay bare the vault of the vagina, and inaugurate the plastic work on the collum and the vagina. Emmet's trachelorrhaphy and the successful fistula operations of Simon and Bozeman appeared as triumphs at this stage. Intra-uterine treatment was improved by the use of sponge tents in dilating the cervix and thus opening up the cavity of the uterus. In this way, after continuous efforts, the mucosa could be reached, curetted, and medical treatment applied.

The next step forward was in abdominal surgery. We not only operated upon true neoplasms as did Koeberlé and

Keith, Pean, Hegar, and Karl Schroeder, but also upon inflammatory masses. Lawson Tait, Hegar, and I proved at that time the possibility of achieving satisfactory results by abdominal operation in cases of oöphoritis and salpingitis. It was at that period we learned to our great surprise that many of these supposed inflammatory masses were due to the ectopic location and growth of a fertilized ovum.

In the meantime W. A. Freund had found a way, by means of a combination of the abdominal and vaginal methods of operation, to extirpate that most fatal malady, cancer of the uterus. It is true that in the beginning the results of this method of operation did not equal what was expected therefrom. Freund's operation, however, led the way; later, first at the proposal of his former pupil, Emil Ries, in the past ten years it has been enlarged so as to include the pelvic tissues and retroperitoneal glands. This procedure is considered today the typical carcinoma operation.

Freund's advance gave an impetus to extirpation of the carcinomatous uterus by means of the vaginal route. Czerny, Billroth, and Schroeder have lead us along this way. A mighty step forward was taken. By means of the vaginal separation of the uterus we have learned, in cases of non-malignant disease of the uterus, not only to extirpate vaginally the adjacent organs, but also in certain cases to preserve them after the diseased parts have been removed; atretic tubes are opened up, partly diseased ovaries resected, and the healthy remainder conserved. This advance marked the beginning of conservative operations in gynecology.

A further step was the treatment by operation of deviations of the uterus which before that time had been given only orthopedic attention. The ideas of Sänger and Olshausen opened up a wide field of operative activity for uterofixation. It was only when experience began to prove the late definitive results that the Alexander-Adams operation began to be much more widely used, and pushed the ventral fixation

into the background. The rapidly increasing frequency of laparotomy for this purpose was somewhat interfered with by Dührssen and Mackenrodt, when they showed at the beginning of the last decade of the nineteenth century that there was a safe vaginal method of exploring the true pelvis and all of its organs.

It almost seemed for some time that the abdominal operation should be limited to large tumors in the peritoneal cavity. After a few years a reaction set in, especially as far as extra-uterine pregnancy was concerned, and then as regards the inflammatory diseases of the adnexa. This occurred in spite of the advantage gained by the median vulvovaginal incision of Dührssen, and especially of the lateral incision of Schuchardt, the cicatrization of the latter showing better results than the former. Both of these incisions give a satisfactory exposure of the vaginal pouch and a free route to the pelvic organs.

It is no doubt evident that in the course of the present century the enthusiasm for vaginal operation has subsided, so that today even such confident advocates as Mackenrodt have withdrawn from it, and use the abdominal method in the majority of cases. This glance shows that the operative technique has undergone a peculiar undulation. After a short period, during which the vaginal operation was highly favored, laparotomy came into use until further improvements were made along the line of the vaginal technique. Again, laparotomy took the lead, and by its victorious advance the vaginal operation is placed on a most modest basis today.

We ask, in view of this, what have been the conditions allowing gynecological operations to develop to such a degree? The way was prepared by getting a closer insight into pathological anatomy. This gave a basis for improving the diagnosis. B. S. Schultze, the Nestor of German gynecologists, did much toward its development, and secured for himself

a meritorious place along this line of work. We have learned to differentiate the process before a tumor distends the abdominal wall, and before the entire true pelvis is blocked by the diseased organs. Following the counsel of Karl Ruge, we obtain pieces of the mucosa of the uterus and build up a diagnosis from its microscopic examinations. In addition, today biological-chemical methods assist us, so that by culture and inoculation, by blood investigation, by a study of the secretions and excretions, we are able to get far into the field of diagnosis. We dare not forget, however, that there is yet wide extension necessary in the methods of investigation. It is in this very field that there is much work yet called for. On the other hand, many a question is open; for example, how far are genital disorders responsible for those of the urinary system and the appendix, how far may the views of Hegar and Freund, as to the significance of infantilism, about which until today we know so very little, be correct.

We must thankfully acknowledge that our activities would never have reached such extension if antisepsis had not been replaced by asepsis. You all have witnessed this development; we all so thoroughly agree in honoring Holmes and Semmelweiss, Pasteur, Koch, and Lister, that one needs only to mention their names. The result of their labors is seen everywhere, and its benefits extend to all departments of medicine. We, as gynecologists, it must be acknowledged, in our efforts have done a good deal toward aiding the work along this line. In the course of the development of our operative technique, we are beginning to see a rich harvest before us. Sufficient up-to-date material is now at hand to study not only the primary results of our operations in large statistical collections, but to state also whether the results be permanent or not. We cannot deny that this testing of results brings us many disappointments. In this way many defects and false conclusions have been pointed out to us,

which seriously invite criticism of our own work and prove it with renewed energy.

If in such a critical manner we examine our operative technique of today, laparotomy claims the preference over the vaginal method, on account of its bringing before us with greater clearness the pathological conditions of the whole peritoneal cavity. That is certainly to be admitted, even though the vaginal method as it appears in its development today, and as far as localized processes go, leaves nothing to be desired in the way of a wide opening in the pelvic floor to the space below the pelvic brim.

Until not long ago the most powerful claim against an abdominal operation was raised on account of the great danger to life connected with it as shown by statistics and also on account of the number of complications following it.

It is without further discussion to be admitted that in reference to the first of these disadvantages, namely, the high mortality, essential advance has been made. When we compare our aseptic measures of today with those previously used, we will at once notice the vigorous stand assumed today toward septic infection. The danger of sepsis in laparotomy increased in proportion to the amount of exposure of the peritoneum to pathogenical organisms: it is being universally attempted to shorten the operation as much as possible. At the same time the injurious effects of narcosis are considerably lessened, and care in upholding the resisting power of the patient shows decided and evident results. Furthermore, the safe healing of the incision is insured. The incision, as practised by Pfannenstiel indubitably protects remarkably against stretching of the incision.

This we freely admit. Experience has taught us, however, that these scars are not absolutely guarded against serious stretching. Even with perfect asepsis and primary healing of the incision, the physiological processes (pregnancy, climacterium) which belong to the physiology of the female body

render these scars objects of tension. If, on account of some accident or some unknown reason, the healing is not effected per primam, the question of cicatricial extension looms up in a more alarming manner. While it is true that the master operators have long series of perfect healings, even they cannot feel certain that there may not be some infection of the abdominal incision, and this danger increases if the operation is upon inflammatory structures. This is present in all those cases where drainage of the field of operation is called for. In addition, another complication is to be considered as a most serious one, endangering the late results even after ideal primary healing of the incision and after a perfect primary convalescence. I refer to the terrifying frequency of adhesions of the intestines and of the omentum to the abdominal incision as well as to the stump from which the tumor has been removed. These adhesions and the significance of their consequences have been demonstrated to us by the observation of our patients for many years. No modification in our methods is at hand to cause them to disappear with certainty; neither the careful handling of the peritoneum during the operation, nor the so-called "peritonealizing" of defects, nor the attempts of influencing the peritoneal layers by bringing oily substances or salt solution in contact with them, nor the early action of the motus peristalticus counteract these complications to any satisfactory extent. They will be a constant source of danger in a laparotomy, at all events more so than in a vaginal operation. Of course, the pelvic organs are not in any way insured against the formation of similar adhesions, but if I may speak from my own experience, they occur hereby very much less frequently.

The formation of a scar in the pelvis follows with such regularity that an exception becomes very marked. Continuous ulceration of such an incision is extremely seldom, even when it is necessary to drain an infected region. Late

complications, such as hernia, are extremely rare. Also in the vaginal operations, beyond question, at times, pathological organisms ooze over the field of the incision; as a rule, however, encapsulation rapidly sets in, and the drainage through the vagina is sufficient and effectual.

Certainly vaginal operations require a special training; I might say, a more minute operative experience. It is not always so easy to expose the vault of the vagina and to force our way to the peritoneum in order to view the pelvic organs. The advantages gained, however, are a sufficient return for the pains taken, even more when we consider that after a vaginal operation the patients quickly get on their feet again, quite as soon as after a normal birth; earlier than after the most simple and bloodless and aseptic laparotomy.

That the modern method of narcotizing does not necessitate a difference between the two methods need be only mentioned here, so that the convalescence from none of these operations demands a long dorsal posture. The sooner the patients move about and then leave the bed, the more certainly are avoided the dangers of a long dorsal posture upon heart and intestines.

That the vaginal method can come in consideration only for a limited field of gynecological affections is to be acknowledged; but no one is entitled to say that tumors of the uterus and ovaries should be approached only by the vaginal method as long as they are situated in the true pelvis. I do not know of such a limitation. The boundary does not depend upon whether the tumor lies in the pelvis or not; it depends upon its movability. Even very small tumors which are firmly adherent should not be attacked by the vaginal route. On the other hand, much more voluminous masses can be operated upon vaginally if their peritoneal surface is not adherent to the neighboring organs, as their size can be diminished either by morcellation or puncture. In some cases, indeed, according to von Ott's method, these adhesions can be

readily exposed to view so that they can be separated; as a rule, I consider such adhesions as a counterindication. To be sure, even very firm adhesions may escape our diagnosis before the operation; nevertheless, a careful taking of the previous anamnesis often points to a previous peritonitis. We learn by riper experience to find these adhesions as well by touch as by their sensitiveness. And if in a vaginal operation we do unexpectedly meet with such adhesions, what hinders us from discontinuing it and ending with an abdominal section? Only now and then have I been compelled to do this; there was no injury to the patient from such a procedure.

Treating the deviations of the uterus by vaginal operation has resulted in serious disorders in pregnancy and parturition. When the fixation is made in the lowest part of the corpus, this fully develops when pregnant and acts normally in parturition as a large number of instances have proved.

No plan for restoring the normal seems to be free of failure, but none gives a smaller cicatrix from which disorders may result. The vaginal route seems to come today more in favor as following the advice of Kiefer, Gebhard, and many others; the shortening of the round ligaments can be performed with complete safety through a vaginal incision.

An important advantage of vaginal operation is given by the frequency of coexisting diseases of the uterus, of the adnexa and peritoneum, and of the vagina and the perineum. This fact has gained remarkable significance, since not only the uterine displacements, but also the inflammatory diseases of the tubes and ovaries, and especially the ectopic insertion of the ovum do give us an indication for operation, I might say almost daily.

This consideration seems particularly indicated for the treatment of retroflexion, combined as it is in the majority of instances with procidentia of the vagina, cystocele and rectocele, and the loss of the perineum.

The procedures advocated by Freund, Wertheim, Schauta, and others for extreme prolapse of all the pelvic organs, and especially to support a prolapsed bladder by means of the uterus turned upside down and placed under the bladder, furnish a wide and significant increase to the existing indications for vaginal operations.

Our views as to the treatment of the inflammatory condition of the tubes and ovaries have been thoroughly changed within the last few years, since better knowledge of their etiology and significance has been obtained. Much more frequently than was formerly acknowledged, gonococcus infection involves the tubes and peritoneum. Under proper treatment, healing commonly takes place and so complete may this be that full functional activity is regained. We have likewise a better knowledge of the conditions underlying septic infections and tuberculosis. Only a minority of these cases offers an indicatio vitalis. Very frequently we find healed processes of this kind a long time after the first stages of the disease have passed, when a recent disease is met with or some recurrence of the old one requires operation. In such cases we find dried-up pus, which proves to be sterile. Thickenings and adhesion indicate beyond question what serious processes have gone on sometimes many years before. In the meantime patients have enjoyed apparently perfect health. Such cases, aggravated even by repeated serious recrudescences, heal undoubtedly very frequently and completely without operation. Such observations compel us to consider most earnestly as to whether it is right to remove these inflamed organs as long as there is no immediate danger of life. In fact, very frequently patients recover without operation in spite of gonorrhea, tuberculosis, puerperal fever, or septic infections from plastic operations.

Whether it is more advisable to operate during the acute feverish attack "à chaud," abdominally or vaginally, is a question that has been much discussed. In recent years I

prefer the vaginal method for operating on such fresh inflammatory cases of salpingitis, oöphoritis as well as para- and perimetritis. I open by vaginal incision in order to drain through the vaginal vault, reserving laparotomy for general peritonitis. Such patients not only recover so far as relief of symptoms is concerned, but I have in a number of instances observed subsequent pregnancies and perfectly normal puerpera. The larger number of these cases come to observation in the stages between the acute attacks. In such we decide upon operation when general and medical treatment directed toward resorption have failed. Less voluminous masses without very dense adhesions can be readily removed by the vaginal route. Large masses, and those in which the question of adhesions cannot be definitely settled by examination before operation, are to be removed by the abdominal route.

Varying indications are met with in the course of development of tubal pregnancy. Cases in the advanced stage, when the pregnancy has extended over a period of about three months, should be treated abdominally. In earlier stages unruptured extra-uterine pregnancies can be safely attacked vaginally. It is disputed as to which course to pursue when rupture has occurred. Here we must determine whether a hematosalpinx (sactosalpinx hemorrhagica) has formed or a hematocele. I have safely operated upon the former by the vaginal method when the tumor was larger than a fist, and in cases of the latter also when the blood appeared to be encapsulated. The control of the hemorrhage, the removal of coagula and sac can be performed by the vaginal method with complete safety. Basing all operation upon the principle of removing only parts which are proved to be irrecoverably diseased, in some cases of hematosalpinx the tube can be emptied by longitudinal incision and this incision can then be closed. I concede, however, that under unfavorable circumstances, as lack of sufficient operative routine, and where assistance is unsatisfactory in the house of the patient,

laparotomy allows us to care for the bleeding tube rather easier and quicker; and this is to be our first consideration when hemorrhage threatens the life of the patient.

Recently, Schauta has given a wider perspective by operating upon cancer of the neck of the uterus by means of a very extensive vaginal operation. He reports splendid primary and permanent results, based on a large material. The extirpation of the parametrical connective tissue can be safely accomplished in this way. Schauta does not attempt to remove the retroperitoneal glands. It is true that by doing so he diverges from the present-day view of surgeons—removing any gland within reach in cancerous outgrowth. Schauta depends upon the fact that enlarged retroperitoneal glands excised in cancer cases have proved only in a minority of instances to be cancerous.

I have attempted to give a fair view of the abdominal and the vaginal route. I fully appreciate the difficult position of the latter; its dominion is limited. It requires a special routine in diagnosis and a particular training for operation. I perfectly know that in this country quite exceptional attention is paid to the appendix, which you remove far more frequently than we do.

I hope that you will consider these remarks based upon intimate consideration of the subject. In case you resolve to give vaginal work once more a fair chance, I dare hope that, meeting some years later, many of you will agree with me in valuing it higher than is usual today.

ABDOMINAL AND VAGINAL CELIOTOMY.

A COMPARATIVE STUDY OF THE VALUE AND EFFECTIVENESS OF THESE OPERATIONS, WITH NOTES ON THEIR INDICATIONS AND TECHNIQUE.

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Both methods, the abdominal and the vaginal celiotomy, are today so far developed that, from a purely technical point of view, it is actually possible for us to carry out all gynecological operations on intraperitoneal organs in both ways. In the choice of an operative method not the operator's own practice and habit, nor his personal predilections, ought to be decisive, but simply and solely the bodily welfare of the patient, nor should esthetic considerations, as, for instance, how well the wound will look or how much it will be visible, weigh heavily in the scale; we must rather prefer that method which offers the best chances, both primary and secondary, for the life and health of the person concerned.

The abdominal celiotomy possesses very important advantages. The possibility of making the opening in the abdominal wall just as large as we choose gives us the advantage of the largest possible view over the field of operation. The operation can be performed with all the carefulness imaginable. We can apply with equal surety the principle of conservatism or of radicalism according to the needs of the case. The operation can be extended to neighboring organs and also

to other organs situated higher up without any difficulties of approach. It enables us to provide the intraperitoneal wound surfaces with peritoneum in an exceptionally careful way in order to prevent disturbing adhesions and postoperative ileus. The disadvantages and dangers of the abdominal celiotomy that we used to be taught in former days have lost some of their importance through the improvement of asepsis and technique, and we can affirm today that we are able with the greatest certainty entirely to avoid postoperative hernia, as well as to prevent the occurrence of peritonitis, provided that we have to work on an aseptic object. Abdominal celiotomy, therefore, is the established method of treatment for all aseptically pure cases of neoplasmata, of extra-uterine pregnancy, chronic pelveoperitonitis, and so on. When the object of the operation is not aseptic the vaginal way may be the better, but we must first make sure that the infecting matter will be certainly and completely removed.

Colpoceliotomy has, generally speaking, the advanage that the operation is borne better, but this difference is to be perceived only when we have to operate on a non-aseptic organ, as, for instance, a carcinomatous uterus. Vaginal fixation of the uterus or vaginal ovariotomy do not come off better than ventrofixation or ventral ovariotomy, both with regard to the mortality and to convalescence after the operation. The second so-called advantage of the colpoceliotomy is that usually it leaves behind no visible scar. But with our modern technique and careful sewing we can shape also the abdominal scar very thin and fine; it can even be rendered almost invisible. Sometimes the vaginal scar is indeed, invisible, but yet very troublesome and continually painful, not only the scar in the vaginal fornix, but more especially the scar through the vagina and the perineum, which arises after difficult operations requiring a large incision. I have seen very ugly scars which were especially irksome to the patients in sitting and walking.

On the other hand, colpoceliotomy has the great disadvantage of the over small opening with all its consequences. At the time in which the vaginal operations were being worked out this small opening caused a great deal of harm and even claimed many victims through insufficient control of hemorrhage, through injury of bladder, ureters, and rectum, and through mistakes in the asepsis. Nowadays, when the indication for this operation has been more narrowly limited, things have become better, but the nuisance of the small opening is always making itself felt anew, especially since we have got to know the inner relation between the vermiform appendix and the inner genitals, and have recognized the necessity of enlarging the radical operation for carcinoma.

For this reason the vaginal operation is, generally speaking, unsuitable for the carcinomata of the inner genitals. These are the malignant ovarial neoplasmata and the uterus carcinoma.

That the vaginalist dispenses with the removal of the glands is not, in my opinion, so serious a matter, but it seems to me to be a question whether the removing of the paracolpia and parametria gives such a perfect result as in the abdominal operation with regard to radicalism on one hand, and the sparing of the neighboring organs on the other hand. But we should make a full use of the good experience which we gained in former days with the vaginal extirpation of certain kinds of carcinoma, and we should learn to select such cases and reserve them for vaginal extirpation, which is beyond doubt charged with a lower primary mortality. These are certain forms of portio and corpus carcinoma, such, namely, as are in the beginning of the extension, which only make their appearance at a later age, and which are hard, rich in tissue, and poor in cells. In the portio vaginalis we are especially concerned with the carcinomata which begin at the external os proper. All these forms which grow slowly and show little inclination to the infection of the glands, can be confidently

handled by the vaginal way. All others, especially the more advanced cases, the softer richly cellular forms, the juvenile cases, but especially all cervix carcinomata, should be dealt with as radically as possible from the abdomen, in the same way as in the primary carcinomata of the vagina.

Of the benign neoplasmata of the inner genitals, the myomata, if they exceed a certain size, are best dealt with abdominally. Myomata of more than the size of a child's head are more easily and carefully dealt with abdominally; but even with smaller tumors I prefer abdominal celiotomy, if the introitus and the vagina are narrow, virginal, and inelastic, because the incision through the abdominal walls seems to me to permit the removal of the tumor with less traumatism than the auxiliary paravaginal incision. There is only one indication which I acknowledge for vaginal extirpation, and that is the operation in the case of an infection of a myomatous uterus. In such cases, provided the vaginal introitus is not too narrow, we should endeavor, when possible, to remove even the tumors above the size of an infant's head by the vaginal method and by skilful morcellement. Special practice is needed for this, a special supply of instruments and good assistance.

As to the ovarian tumors, we must from the outset exclude from the vaginal operation all solid and malignant tumors, as well as all cases complicated by adhesions, by a intraligamentous location, by axial rotation and other disturbances. But even the uncomplicated cystic tumors are better removed abdominally, because in this way the implantation of particles of the growth in the abdominal cavity is most surely prevented. The small opening in the fornix in colpoceliotomy brings with it the consequence that the tumors often cannot be reduced without morcellement, a course which in all epithelial neoplasmata should be decidedly rejected. On this account vaginal ovariotomy ought to be generally dropped, in spite of the ease with which it can often be carried out.

Exceptions must be made to this determination of indication in the case of the ovarian tumors, as in that of the myomata. The vaginal operation is occasionally to be preferred in the case of the incarceration of a cystic tumor during labor.

This is also true of ovarial abscesses or, suppurating uniocular tumors situated in the pelvis. There I recommend the following procedure: (1) The kind of the bacteria contained in the abscesses is determined by careful aspiration with a fine needle. If the contents turn out to be of a septic nature, we should make a vaginal incision and await the healing up of the abscess cavity in order afterward to remove the tumor abdominally. In the case of harmless bacteria and of all large and multilocular tumors, we should, without hesitation, operate abdominally, with a large incision and with the endeavor to remove the tumor if possible intact.

As regards inflammatory ailments, I have already considered the suppurating forms. In so far as the infectious matter can be completely removed, the vaginal way should be preferred. In the case of the chronic inflammations, however, the abdominal route offers without question superior advantages when we take into account the requirement of the conservative treatment. Spare the ovary as far as possible—that must be the motto in all chronic inflammatory diseases, including tuberculosis of the inner genitals. The tube and the uterus are much more heavily endangered in all inflammatory ailments than the ovary, and therefore—supposing that an operation is indicated at all—they, as a rule, need much more the radical removal. Above all, however, in view of the so frequent participation of the vermiform appendix in chronic inflammation, abdominal celiotomy is expedient.

With the chronic inflammation of the genitals we must also class chronic pelveoperitonitis. In so far as this causes continual complaint we should carry out the abdominal operation. Further, the retrodisplacement of the uterus which is connected with pelveoperitonitis (the so-called retroflexio

uteri fixati) belongs to the domain of abdominal celiotomy, and not to the vaginal operation.

Extra-uterine pregnancy is also best dealt with by abdominal celiotomy. Only suppurating hematocele should be treated like a pelvic abscess and operated vaginally.

The complicated gynatresiæ also belong to abdominal celiotomy, while the simple hematocolpos should naturally be discharged from below.

As to the malpositions of the genitals, I take the standpoint that in this case too much operating is generally done. Mostly no correction of the position is indicated at all. The cases in which it is indicated are, as a rule, complicated.

Retroflexio uteri never needs correction of position in uncomplicated cases. Among the complications is pelveoperitonitis, of which I have already spoken. Here the ventral operation is indicated, consisting in a loosening of the adhesions and including the necessary operations on the adnexæ, followed by ventrofixation, in order to lift the uterus out of the region of the adhesions. The other extremely frequent complication of the retroflexio is the total relaxation of the organ and the sinking of the vagina. Relaxation of the isthmus uteri (the lower uterine segment), and atony of the muscles of the pelvic floor almost always go hand in hand. In this class of diseases, besides other splanchnoptotic phenomena (movable kidney, sinking of the stomach, and colon transversum), we also have cystocele. None of these states of relaxation of the uterogenital apparatus can be healed by the abdominal way. Here the only method which can reckon upon permanent success with regard to the pelvic organs is a properly executed vaginal fixation of the uterus, combined with colporrhaphia and perineoplasty.

In these remarks I have, of course, only been able to discuss the chief indications. I have not the time to adduce points of view which also, perhaps, are not wholly unimportant. I can recapitulate that, according to my conception and experi-

ence, abdominal celiotomy decidedly deserves the preference for the intraperitoneal gynecological operations, but that a number of indications rather sharply defined remain over for colpoceliotomy.

If a short time ago we had grounds for setting up the principle that whatever is within reach of the vaginal operation should be dealt with vaginally, the progress of the last ten years in asepsis and technique has changed this principle.

We are today more than ever convinced that the sparing of the biological powers of the body is of great importance, both with regard to general vitality, and most especially with regard to the local functioning of the tissue; that we must operate skilfully, quickly, and carefully, but that carefulness is more important than quickness.

The organs and tissues must be guarded against useless touching, and especially against strong pressure. The continuous compression of the abdominal walls by retractors, especially by the self-supporting ones, is to be avoided. The peritoneum must be protected against air germs and other injurious objects; the bowels should not be eventrated if possible to avoid it. Disinfectants should be kept at a distance from wounds and peritoneum. The Trendelenburg position should not be too steep and should not last too long not only on account of the heavy burdening of the diaphragm by intestines with its consequences for the breathing, but also because a too intense hyperemia of the peritoneum arises from it. The control of bleeding should be painfully prompt. The intraperitoneal wounds must be most carefully sewed over with peritoneum. Drainage and tamponade are to be avoided as far as possible. As sewing material, catgut is preferable for buried sutures and silkworm gut for the skin. The treatment of the patient before and after must have regard to the conserving of her strength, and must be adapted as much as possible to the physiological and individual circumstances.

As the best method for the abdominal celiotomies, I recom-

mend my suprasymphysar transverse incision through the aponeuroses, which, rightly applied, can be employed satisfactorily in about nine-tenths of the gynecological abdominal celiotomies. The incision through the skin can be made, if required, from one spina of the ileum to the other; the incision through the aponeuroses can be easily prolonged to the outside over the lateral edges of the rectus muscles, by doing which one is enabled to split the musculi obliqui along the line of their fibers. The detachment of the aponeuroses from the rectus muscle should be effected upward as far as the navel, downward as far as the symphysis, whereby the musculi pyramidales remain upon the flap of the aponeurosis.

If, then, the musculi recti and the peritoneum are severed in the linea alba, we have a very large opening of the abdominal wall, suitable for the largest and severest operations, and more especially we make it easier to operate deep down in the pelvis and in its lateral parts. In nearly a thousand operations I have never once been obliged to add to the transverse incision a longitudinal incision through the aponeurosis in an upward direction to beyond the navel.

The sewing of the abdominal wall is carried out in four layers: (1) The peritoneum; (2) the rectus muscles; (3) the aponeuroses; and (4) the skin.

The sewing of the peritoneum and the muscles is carried out with a continuous thread of catgut, the sewing of the aponeurosis also with a thread of catgut, the sewing of the skin with interrupted silkworm sutures. I set the greatest value upon careful arrest of hemorrhage (to avoid hematomata) and upon the exact connection and adaptation of the edges of the wound.

This kind of incision has the great advantage that, even with a moderate raising of the pelvis, it affords the bowels great protection against the outer world, and thereby prevents a number of injuries. This appears very clearly in the statistics of mortality. I had a total mortality of 5.24 per cent., and

I must hereby remark that the uterus carcinoma operations, which so heavily burden our modern statistics, as well as others carried out on a non-aseptic object, have also been included.

Convalescence is more easily completed, and the healing proceeds more quickly in the patients operated upon by the transverse incision, especially since, after the example of American operators and following Krönig's treatment in Germany, I have caused the patients to get up and move about in a short time.

The healing of the abdominal wall was absolutely good (prima intentio) in 95.4 per cent. with transverse incision.

In intimate connection with the healing of the abdominal wall stands the quality of the scar and the question of abdominal hernia. The scar is extremely fine, never broad or disfiguring; it disappears gradually more and more according to the direction of the fibers of the skin in the lower abdominal region, sometimes to the point of complete invisibility. In the total number of cases postoperative herniæ were observed in 0.94 per cent., and I remark hereby that these occurred exclusively in the cases of suppurating abdominal walls. In those cases in which prima intentio was to be marked, a hernia was not once observed (in more than 300 cases investigated by the year and the day).

In the comparatively rare cases in which I execute a longitudinal incision in the linea alba (with very large solid tumors, with complications of such a kind that an operation is expedient at the navel or in regions situated higher up), I consider that the best methods, according to our experiences hitherto are the incision according to Lennander and the overlapping suture which is practised by Charles Noble.

As regards the colpoceliotomy technique, I can express myself shortly. I hold with Döderlein that the way through the anterior fornix, that is to say, between bladder and cervix, is decidedly a *tour de force*, although I must admit that the

operation affords a better view of the operative field than the colpotomia posterior. As I perform both operations only rarely and exceptionally, I shall forbear in this place to enter upon technical details in these methods of operation.

In pelvic abscesses the way through the posterior fornix is self-evident. In vaginal extirpations I individualize, beginning the incision sometimes in front and sometimes behind. The median bisection of the uterus or else morcellement may be advisable.

If the radical operation is expedient on account of the suppuration of the genitals, it may be desirable to apply clamps for two days and to employ iodoform gauze drainage. Otherwise, if it is at all possible, the peritoneum and the vaginal wound must be carefully closed. For the prolapsus operation the anterior fornix is the chosen way.

With this I will bring my remarks to a close, though I am perfectly conscious that I have not discussed all the points of view which arise in connection with the operative treatment of intraperitoneal genital diseases. I have been content to treat of the general principles which, in my judgment, should weigh in the choice of the operative methods, and to show how it is possible to give effect to these principles. For the rest we must, of course, be ruled by the endeavor to individualize as much as possible for the benefit of the patient, and, moreover, to turn to account the progress which we still have to expect from the art of surgery.

DISCUSSION ON THE PAPERS OF DRS. MARTIN AND PFANNENSTIEL.

Dr. Charles P. Noble.—We have all listened with great pleasure to the papers of our two distinguished guests. The paper by Dr. Pfannenstiel presents the subject very largely from an American point of view. Indeed, there is

only one of the various points he has made which would in any way differ from the point of view held by myself, namely, the question of how to deal with suppurating ovarian tumors. He advocated incision and drainage of these septic ovarian tumors, with the idea that the wound would heal, and then subsequently the tumor could be removed. In my own experience in dealing with suppurating ovarian tumors, I have found very few of them in which healing would occur. I have tried this method in a number of cases and, as a rule, the drainage openings did not heal, and so it was necessary to operate with the field still more septic than though the radical operation had been done in the beginning.

The other point which I might mention is the question of how to deal with fibroid tumors; that is to say, the point of limitation, where we should select the vaginal route for the removal of fibroid tumors in preference to the abdominal route. Professor Pfannenstiel stated that although a limit should be put as to the size of the tumors, viz., the size of the fetal head, in his own work he preferred the abdominal route for even smaller tumors. In that I heartily concur. The only classes of fibroid tumors in which I personally prefer the vaginal route is the one emphasized by him, namely, the septic fibroids, and then in that class of submucous fibroids or other small fibroids in which we can do a myomectomy rather than a hysterectomy. For operations on fibroids, even though small, in which we are going to do hysterectomy, personally I prefer the abdominal route.

I had the pleasure some two years ago of visiting Professor Pfannenstiel's clinic and of seeing him apply the principles which he has enunciated today, and the Pfannenstiel incision, as I saw him practise it, gave most admirable control over the field of operation. It seems to me the special advantage which this incision has over the usual longitudinal incision is that it makes a conservative use of the recti muscles. In the ordinary abdominal incision the tone of the recti muscles, the tonic contraction of these muscles, is of no service whatever in maintaining the wound in apposition during healing. It is clear that with the Pfannenstiel incision the recti muscles act in a conservative way in holding the wound together, and that is a distinct advantage it has over the longitudinal incision.

Dr. Clement Cleveland.—I have listened to these two papers with the greatest interest, and particularly to Professor Martin's classical relation of the history of this subject in the last fifty years, and we owe him a debt of thanks for coming this great distance a second time to place his views before us. We are always interested to hear from him.

With reference to the remarks of Professor Pfannenstiel, I wish merely to speak of his incision which I make use of to a large extent. I like the incision and I find it of great advantage in many ways. You can see the pelvic organs most clearly; you can get at them more readily than by the longitudinal incision. Moreover, you can place the abdominal pads more to your satisfaction, you can get rid of the intestines to a better advantage, push them farther out of the way, and be sure that they are not in the field of operation. You can reach the appendix very much more readily. I have been in the habit of removing the appendix if I have any indication for so doing, after I have arranged with my patient beforehand to do so, if I see any reason for it. In the majority of cases they wish it removed if there is the slightest indication of disease about it. I dislike the longitudinal incision in fat women especially, preferring that of Pfannenstiel, because at one point low down close to the pubis there is usually a deep depression due to the overlapping of the predominant fat, and that crease or depression is very difficult to disinfect, and sometimes it is most necessary in a long incision to extend beyond that point. It is most difficult to protect it from infection. In fat women I have found most of my suppurative cases of the abdominal wall have started from that lower portion of the incision, and I am in the habit of making the Pfannenstiel incision in a line directly across in a line from the anterior superior spine of the ilium or rather a little lower. I always use a continuous suture in the peritoneum, bring the muscles together with interrupted sutures, and I now in all cases follow Dr. Noble's method of overlapping the fascia, using the mattress suture, and I did use to some extent the chromicized catgut, although I prefer No. 2 plain sterilized. I think, by doing as I do, the stay suture of silkworm-gut passing through the integument, fat, and fascia, you do not need the longer lasting suture of chromicized gut. I think

the No. 1 ordinary catgut or No. 2 is sufficient. With the Pfannenstiel incision I have never yet met with suppuration.

Dr. I. S. Stone.—You may remember that some years ago we had a discussion of this character in this country, and on one occasion a very distinguished friend of ours came from across the water and introduced his method of performing various vaginal operations. He saw a number of operations done by some of our best operators by the abdominal route, and the consequence was he returned home enthusiastic over that method. However, I do not see that we can go over the ground to our advantage and leave certain problems untouched which will influence our sentiments and our studies in the future. I think that there are certain problems to be worked out in the abdomen which can never be solved by the lower route. Among other things I believe that the various displacements of the uterus and bladder very often have their origin in Glénard's disease, or the dropping down of the viscera; not merely an elongation of the ligaments in the pelvis, but beginning much higher, and that in nearly all of the cases there is not only hernia, but far back of that a descent or enteroptosis. Therefore, it would be impossible for anyone to go through the vagina to reach and deal with some of these cases successfully. If we are to solve these problems it must be done by looking into the abdomen and studying the causes which lie behind. Everyone knows that we frequently have to take out the appendix in some of these cases. That is a common matter in my experience. I have in mind two cases, in both of which ileus was caused by the appendix, which was several inches long and could not have been dealt with, even if located, through the lower route.

Again, there are cases not only of stenosis due to tuberculosis and to carcinoma, but occasionally cases of congenital origin, which can never be anticipated until the abdomen is opened. The tuberculous cases are of extreme importance. We speak of women most frequently because we are gynecologists, but even in any abdomen we may unexpectedly find a tuberculous condition of the bowel or of the mesentery or omentum. It would be very annoying to me if I should undertake to do a vaginal hysterectomy or any of the operations which have been mentioned today, and later

on find carcinoma, tuberculosis, obstruction, or trouble from the appendix, dislocation of the viscera, etc., which we should have treated directly through a median abdominal incision.

I have tried the incision of Professor Pfannenstiel in a number of cases, and I regard it as strictly applicable to pelvic work. It reminds one of the McBurney incision which is useful within narrow limits. Neither one of these are useful if we wish to extend our investigations from the pelvis to the upper abdomen. Therefore, the method of Professor Pfannenstiel appears to us useful more in a cosmetic sense than otherwise.

Dr. J. Riddle Goffe.—It is extremely interesting to hear from these distinguished gentlemen, after these many years of experience in their own country and their extensive observations of the work of other operators, the point of view they now entertain in regard to the relative merits of the two routes of attack.

I have been studying the vaginal route as a method of attack for some years, and for a number of years I adopted it almost exclusively for the purpose of learning its limitations. I have modified my practice somewhat, so that now I do not regard its field of application quite as wide as when I first began.

I think we in this country are agreed with the gentlemen from abroad that cases of pelvic abscess, especially when we have infection, with temperature and high pulse, are always better attacked through the vagina. Also cases of hematocele or the debris of an ectopic pregnancy, especially if it has become infected. I do not think there is any question in the minds of any of us that such a condition can be more safely and efficiently attacked through the vagina.

When we come to the consideration of the treatment of fibroid tumors, there seems to be some difference of opinion. I find that many cases of fibroid tumor can be subjected to attack by the vaginal route, myomectomy done, and the uterus saved. I am doing that repeatedly, whether the tumor be inside of the uterus, whether it be subperitoneal, or intramuscular. Unless the tumor is larger than a fetal head it can be generally attacked with ease, safety, and success through the vagina. The question is, What is the

advantage of attacking it in that way over attacking it from above? I know of none where we have that simple condition, but if we have a case that is complicated by many of the relaxed conditions we find in the pelvis, if we have extensive laceration of the cervix, with endometritis, perhaps rectocele and cystocele, the complications must be dealt with from below, and I find it an easy route of attack for meeting all the conditions. Cases of salpingitis, chronic salpingitis, complicating retroversion or retroflexion with adhesions, many of these cases being accompanied by other lesions, such as laceration of the cervix, with some decensus, very frequently with rectocele, can be better dealt with from below.

I do not hesitate to attack any chronic condition of the ovaries and tubes, whether accompanied by these other conditions or not, through the vagina, and I find my results are extremely satisfactory, fully as much so, if not more so, than when I attack them as formerly through an abdominal incision.

A posterior vaginal incision, which was the one that was originally made, and which many men have constantly in mind when they speak of vaginal incision, does not give us the opportunity to do the work that is necessary. We must resort to the anterior vaginal opening, and an extensive incision must be made reaching from the urethra to the cervix accompanied with a transverse incision. When we have separated the bladder from the uterus and carried the bladder up with the retractors, we have opened up through into the peritoneal cavity as large an opening as the vulvar opening, and, as maintained by many operators, that is as large as most abdominal incisions need to be. Here, then, we have an incision of normal size, which gives us just as clear and extensive a view as an incision of the same size would give us through the abdominal wall, and through that incision, by separating adhesions, turning the fundus down into the vagina and bringing after it the appendages, we cannot only subject them to complete removal when it is necessary, but all sorts of conservative work as well, and I am doing it daily with the utmost satisfaction. This applies not only to chronic cases, but in acute cases as well. Cases of acute salpingitis, with a temperature of 102° or more, with intense pain, I attack through the vagina, separate

adhesions, touch the tubes with tincture of iodine or nitrate of silver, and establish free drainage with iodoform gauze. I am getting most satisfactory results. In many instances I am saving tubes that would be thrown out of commission promptly if the inflammation were allowed to continue. A patient so treated left the hospital only a day before I left home. This was a marked illustration of what can be done in the way of treating acute salpingitis, and thereby saving to the patient functionating tubes.

Dr. Herman J. Boldt.—I have been extremely interested in these two papers. So far as acute tubal inflammations are concerned, with very rare exceptions do I believe it necessary to ever operate upon them until the acute stage has passed. If a tube is greatly distended with pus it stands to reason that the pus should be evacuated, and the only proper way to do that is through a vaginal section, and then leave it for time to determine whether or not subsequent surgical intervention will become necessary.

So far as conservative work through the vagina on tubal inflammation, with an adherent retroverted uterus, is concerned, I personally, of late years, have preferred the abdominal route because it has seemed easier for me to do such conservative work as may be necessary. In about 75 per cent. of these patients we find that they also have a chronic catarrhal inflammation of the appendix. This has been proved by me by making microscopic examinations of several hundred of these appendices which have been removed under these conditions. I made it a rule in all these cases, when the appendix was removed, to submit it to a pathologist, and found that in more than 75 per cent. of the cases of pelvic inflammation the appendix was also affected. In that class of cases I believe the abdominal operation is to be preferred. There is no question at all but what the vaginal operation has an excellent field, but its limitations should be defined. I feel like very many others who have resorted more of late years to the abdominal operation. Up to fifteen years ago I preferred the vaginal operation; I had very extensive indications for it, but since that time from year to year I have limited the indications more and more.

Another point I desire to refer to is with reference to short-

ening the round ligaments through vaginal section. We must bear in mind that many of these cases with a movable and retroflexed uterus, where the round ligaments are drawn out, the thinnest part of the ligament is near its external part. Through the vaginal operation it is not possible to get the thinnest part of the ligament; we draw out the thickest part and shorten it, which should be made to hold the uterus in anterior position. We should work in the opposite direction to what we usually do. If one has only to shorten the round ligament for a posterior uterine displacement, the Alexander operation is the one of preference.

Dr. Robert L. Dickinson.—From a very small number of cases in which the Pfannenstiel incision was made as compared with the large number Professor Pfannenstiel reports, I have been able to draw some conclusions. I began many years ago when Kustner brought out his incision, and the things I learned about this incision I applied to the Pfannenstiel incision, namely, that in very fat women, where there is necessarily much contusion of the adipose layer, *we run great risk of suppuration*. There is an ugly pocket between this incision and the top of the symphysis, in which pus may collect. This is very hard to drain and difficult to diagnosticate. Therefore, I am confining my transverse incisions to women in whose cases I hope to get primary union. Professor Pfannenstiel reports 95 per cent. of clean primary unions. My own results average 100 per cent. in thin women, with fairly good tissues, but not nearly as good in stout women.

Concerning the matter of the pelvic *versus* the abdominal route of attack, I will say it is largely a question of personal skill. The man who has done most of his pelvic surgical work through the abdomen will continue to operate on cases by that route which the other operator would attack by the vagina. I believe that the small mobile ovarian cysts can be removed through the vagina. I have been of the belief that many parovarian cysts should be simply opened and patiently drained through the vagina until complete closure obliterated the sac, instead of making a gap in the broad ligament from above, which involves a considerable operation. And we cannot forget what Dr. Martin has laid so much stress on, that no man, however careful his technique,

however skilful he may be, can afford to court disaster by separating peritoneal adhesions in cases that are attacked through the abdomen, when there may be a safer procedure.

Dr. Seth C. Gordon.—I have a certain use for vaginal operations, but they are almost entirely confined to pus in the tubes. I wait until I am quite sure pus is present, then I make an incision, drain these tubes, and let them alone. I do not agree with Dr. Goffe in attacking acute inflammatory tubes. I would just drain them and let them alone. The idea of making an incision and handling these tubes when the patient has a temperature of 102° or more is all wrong. That is the only possible use I have for vaginal work.

I have never used Professor Pfannenstiel's incision for any purpose whatever. I am not accustomed to it; I have not seen it used much, but I have no doubt it is valuable in many respects. I prefer simply a straight, perpendicular, longitudinal incision, large enough to accomplish all that I desire, and if I find there are other things coming up after I have made my abdominal incision, then I enlarge it if necessary.

In these days, when we have to make an incision large enough to introduce the hand, I believe we should examine the gall-bladder and the appendix, and if anything needs to be done to either of these organs, it can be done through an incision long enough to get one's hand into it. Perhaps this would not do for gallstones, another incision may be made if necessary. However, a longitudinal incision, on the whole, will answer the purpose very much better than anything else.

Another thing they say is that we are in greater danger of hernia. My method of closing the abdominal incision is to carry through a silkworm-gut suture from within outward, always; never carry my needle from above downward, but from within out and thread each end separately. In this way I do not force any germs through the skin. I put them in an inch apart, and close the fascia with a running suture of catgut. If the incision is long I tie about halfway up and start again. I leave these silkworm-gut sutures in at least two weeks, and I do not object if they remain longer, if they do not produce any inflammatory condition of the skin. That gives ample time for absolute coaptation

of the parts, so that I have not seen a hernia in years and years. I cannot go back, after the many years I have been doing work in this way, to the vaginal incision for any purpose except indicated, and I certainly shall not try. A thing that has served me well so far is good enough. I can do all I want to do, all that anybody can do, and it is an incision you can enlarge as you please, and you are almost sure, if you are careful, to get union which is perfect and beyond all question, so that, it seems to me, the method I have outlined is preferable to the vaginal. I have tried the vaginal route for hysterectomy a few times and do not like it, probably because I do not possess the skill to do it as our German and French friends do. Many of you will remember that Jacobs came over to this country and taught us how to do vaginal hysterectomy, and went back a convert to abdominal hysterectomy. Now we may go over there and after seeing them work for a long time may become converts to vaginal hysterectomy, but I am satisfied to pursue the course I have outlined.

Dr. Howard A. Kelly.—I, who have so constantly and persistently stood for abdominal operations all these years, am a little puzzled as to the position that should be taken in reference to vaginal operations (after considering the splendd work that was done by our dear friend, Dr. Pryor, whose work is yet before us, although he has passed away, and also the splendid work Dr. Goffe has done, as well as the great work that has been done by my friend, Dr. Martin, in opening the anterior fornix and so opening the pelvis as to make the pathological conditions therein accessible). In this connection I cannot refrain from mentioning the splendid operation Dr. Martin did in Baltimore recently, for although I have been a very great enthusiast over the abdominal route for pelvic operations, I now feel that there is work which we can and should do through the vagina. As I see it, Mr. President, it appears to me that our first step in this direction will be to handle through the vagina all those cases where there are minor injuries of the pelvic floor, as well as intrapelvic lesions, doing everything through one route. We will also handle more frequently in that way the milder cases of pelvic inflammatory diseases. It is true that the more serious aggravated cases of pelvic in-

flammation, where there are masses attached down behind both broad ligaments, and the uterus seems wedged in between them, and where when you catch the cervix with forceps and it does not yield to traction an inch, are puzzling to the man who has not been trained in vaginal work. I think bisection as an alternative in these serious cases has not yet created sufficient interest as a means of simplifying difficult cases and making them safe. I think we shall do our small fibroid tumor operations through the vaginal route, reserving the other for larger fibroids. I think in taking up the field of vaginal work we will hesitate a little in dealing with virgins at first, and will be rather inclined to do the work from above.

In dealing with the group of cases referred to by Dr. Boldt, every once in a while the appendix needs attention. Not infrequently in these cases of inflammatory disease on the right side, we are doubtful as to whether it is the appendix which is at fault or the inflammatory disease. We have not quite clearly made up our minds as to the fons et origo of the disease, whether it be in the right iliac fossa or below, and sometimes the difficulty is cleared up only by removing the appendix. We remove the appendix in a large percentage of these cases, although not in all; but where there is any doubt and the patient has expressed a wish to have the appendix removed, where there has been any evidence of past inflammatory disease, we do not hesitate to remove that organ.

There is another group of cases not sufficiently observed, and I would like to insist and urge that the members investigate them. Perhaps in 2 or 3 per cent. of the cases—I am speaking roughly now—I find that the gall-bladder needs attention. In a few cases, from the past history of patients, I find they have suffered from attacks of stones in the gall-bladder, and where this is the case I do not hesitate to remove the gallstones.

I have not used the Pfannenstiel incision. I like a straight up-and-down incision, north and south, vertical, as Dr. Gordon describes it; but as I have been so deeply impressed with the fact that there is such perfect healing after Pfannenstiel's incision, I am going to try it, particularly in some of these fat women to whom Dr. Cleveland referred. This incision appeals to me in that class of cases.

From what I have said I may not have presented to you in a very clear way my exact position in dealing with these cases, for the reason that I am undergoing a process of mental adjustment.

I want to thank our distinguished foreign guests for their kindness in coming over here and teaching us.

Dr. C. C. Frederick.—I have been doing both abdominal and vaginal work for a series of years, and from my own personal standpoint I have pretty well crystallized in my own mind the applicability of each route to certain classes of cases. I do not believe the operator who confines himself exclusively to one or the other route is doing his patients or himself justice, because each route has its own field, and I am going to outline to you briefly my own ideas on this subject.

Someone criticised Dr. Goffe for saying that cases of acute pelvic inflammation within twenty-four or forty-eight hours after the onset can be dealt with successfully by vaginal section and drainage of the pelvic cavity with gauze, stripping out the tubes, and relieving them of the local source of infection, etc., but I agree with him and know that these patients so treated will get well in ten or twelve days, whereas otherwise they would go five or six weeks, and possibly have a pelvic abscess and suppurating tubes afterward. It is undoubtedly a curative process in the incipient stage of acute pelvic peritonitis from tubal infection. I never attack chronic inflammatory disease of the tubes and ovaries from below. I always go in from above. These are the conditions where conservatism in operations is necessary. You want to save all of the tubes you can and all the ovaries you can. If I go in and find a tube that is patulous I leave it. If I find a tube that has pus in it I take it out. If I find an abscess in an ovary I do not hesitate to open it, and I usually treat it with carbolic acid or frequently use the cautery, thus destroying all the pyogenic membrane, and leave what ovary there is because the woman may need it in the future. All sorts of large tumors, cysts, etc., I attack from above, but small tumors of the uterus, small fibroids, especially of the submucous class, which produce a great deal of hemorrhage, I frequently remove by opening the fornix, bringing the uterus out into the vagina, doing a myomectomy, closing

the incisions, returning the uterus, and leaving it for future functioning. Small ovarian cysts can be taken out through the vagina, opening through the anteror vaginal fornix, separating the bladder, puncturing the cyst, draining off the fluid, pulling out the sac and tying it off. This is an easy operation, and when these patients get through these vaginal operations there is no more shock than after an operation done for a lacerated cervix.

Dr. Martin.—I am very much pleased that my views regarding this subject have been so well received and substantiated by the work of Dr. Goffe, and by Dr. Kelly, who saw me give a demonstration in Baltimore. It is not only necessary to see these operations, but to do them on the manikin before passing judgment on them.

Two objections have been raised which I wish to answer: One is the advisability of performing the abdominal operation in cases of procidentia. I have seen many abdominal operations for procidentia uteri, but the results have not been good. The operations have not been well done. The operation should conform to the location of the disease.

The other objection made by Dr. Boldt concerns the frequency of involvement of the appendix in these pelvic inflammatory disorders. It is a remarkable fact that the frequency of the involvement of the appendix in these cases varies in different places. For instance, in Germany I have paid attention to the appendix since the beginning of my work, and that comprises a period of more than thirty years, and the number of cases of appendicitis associated with disease of the appendages has been very small. In America appendicitis seems to be more frequent than with us, and I believe constipation and kindred disorders reported in American statistics are responsible for that fact. I believe special training is necessary to make accurate diagnoses in these cases and for doing these operations, but one can by operating on the manikin do these operations on human subjects more dextrously.

Dr. Pfannenstiel (closing).—I have nothing to add to what I have already said in my paper, and if you are interested in the subject I have brought before you, you will find all of the points regarding it in my paper.

THE CONDITION OF THE UTERINE MUCOSA IN MYOMA CASES.

By Thomas S. Cullen, M.D.,
Baltimore.

Since 1893 I have been paying especial attention to the various degenerations that occur in uterine myomata and incidentally to the condition of the uterine mucosa in such cases. The myoma cases admitted to the Johns Hopkins Hospital from its opening in 1889 to July 1, 1906, together with those occurring in the private practices of Dr. Kelly and myself up to that date, amounted to between 1400 and 1500. In the majority of these the uterine mucosa has been carefully examined histologically. In most of our cases in which the uterus was removed supravaginal amputation was employed. As a consequence only in a relatively small number of the cases have we been able to ascertain the histological appearance of the vaginal portion of the cervix.

In nearly all cases in which the uterus was removed we have carefully opened the uterine cavity and studied its appearances both macroscopically and histologically. Pieces of mucosa have been removed from various portions of the cavity, especial attention being given to any area suggesting the least pathological change. It will readily be understood that a histological examination of the mucosa from all parts of the cavity in over 1000 cases would be out of the question, and that the pathological changes in a few cases have undoubt-

edly been overlooked. The findings on the whole, however, are relatively accurate.

The mucosa of the uterus is naturally divided into two main kinds: that from the cervix and that lining the uterine cavity. We shall, therefore, consider them separately.

CHANGES IN THE CERVICAL MUCOSA.

Edema.
Hypertrophy.
Atrophy.
Dilatation of the cervical glands.
Cervical polypi.
Unfolding of the cervical glands.
Cervical endometritis.
Suspicious changes in the cervical mucosa.
Carcinoma of the cervix.

EDEMA. In only one case was edema of the mucosa noted. Here the uterus was partially inverted by a submucous myoma.

HYPERTROPHY. Marked increase in the size of the cervix was noted four times. In each of these cases there was a prolapsus of the uterus. The mucosa in such cases usually shows marked thickening of the squamous epithelium of the vaginal portion of the cervix, and the papillæ projecting into the squamous epithelium are longer than usual and show marked branching.

ATROPHY. Where partially submucous cervical myomata exist the cervix is occasionally so unfolded that little of it remains. The cervical mucosa is put on marked tension and on account of the stretching becomes much thinner than usual. The apparent atrophy is in reality not an atrophy, but a thinning out of the mucosa to allow it to cover a wider area.

Dilatation of the Cervical Glands. Enlarged glands are very common in the cervix and are often recognized as slightly raised circular translucent areas. In our experience dilated glands are not more frequent in myoma cases than in those in which no tumor exists. The dilated glands are usually spherical, but may be irregular. The gland contents, as a rule, are viscid and semitranslucent. Occasionally they are whitish yellow or opaque, owing to an abundance of exfoliated epithelium. Their epithelium may be high cylindrical or considerably flattened.

Cervical Polypi. Polypi of the cervical mucosa in our experience have been comparatively rare in myoma cases. In some instances they were found near the internal os and in others near the external os or projecting slightly into the vagina. They were usually single, but occasionally several were present. The size of the uterus or the situation of the myomata seemed to have little or no influence on the development of the polypi, as they occurred just as frequently when the myomata were small and when no submucous nodules existed. On histological examination some of the polypi closely resembled the normal cervical mucosa, and were in reality nothing more than small areas of mucous membrane that had been extruded and partially nipped off. In other cases the process of extrusion had advanced farther; the polypi were composed of long narrow tongues of mucosa, and the point of attachment to the uterine mucosa was very slender. In San. No. 1872 (Gyn. Path. No. 8433) the glands of the polypi were uniformly and markedly dilated, and the picture resembled closely that of a thyroid gland.

Unfolding of the Cervical Glands. In those cases in which the cervical canal is much drawn out or where the mucosa of the cervix is put on great tension by a large submucous myoma, the glands may literally unfold. The gland epithelium thus forms part of the lining of the cervical canal. Although the squamous epithelium usually ends at or near the

external os, it may extend far up into the cervical canal. If such be the case, when the unfolding of the glands takes place the epithelial lining may consist of two types: squamous epithelium alternating with high cylindrical epithelium. Such a condition we have noted on several occasions.

Cervical Endometritis. Inflammation of the cervical mucosa is relatively frequent where a sloughing submucous myoma or a carcinoma of the uterus exists, but is rarely found under other circumstances even if there is an old inflammatory process in the adnexa. In Case 3199, in which the cervical glands showed proliferation, there was marked small-round-celled infiltration, but the surface epithelium was intact. In Case 12221 there was likewise new gland formation. In the cervix in places the surface epithelium was intact, but at other points replaced by granulation tissue. In Case 2800 (Gyn. Path. No. 312) the omentum was adherent to the large multinodular uterus over a wide area, and the appendages were bound up in adhesions. The cervical mucosa presented a branching arborescent appearance. The surface epithelium was intact; the underlying stroma showed marked small-round-celled and polymorphonuclear infiltration. In Case 12139, the woman had been in the hospital seven years before, and at that time a pelvic abscess had been evacuated per vaginam. When the abdomen was opened the omentum was found glued to the myomatous uterus and general pelvic adhesions were encountered. Sections from the cervix showed that the surface was covered with polymorphonuclear leukocytes. The epithelium was intact, but the underlying stroma showed much small-round-celled infiltration.

Suspicious Changes in the Cervical Mucosa. In at least five of our myoma cases sections from the cervix yielded rather suspicious histological pictures, where macroscopically nothing abnormal could be detected. The uterus in Case 3418 (Gyn. Path. No. 661) was the seat of a diffuse adeno-

myoma of the posterior wall. The cervical glands were in some places normal, but here and there showed proliferation. The epithelium lining the cervical canal was intact. In Case 3199 (Gyn. Path. No. 524) the multinodular myomatous uterus reached to the umbilicus. The cervical epithelium was intact, but the glands were smaller than usual and appeared to have proliferated. The newly formed glands were small and had a lining of cuboidal epithelium. They did not appear to extend far into the stroma, but the latter showed marked infiltration with small round cells. In Case 3349 (Gyn. Path. No. 610) the nodular myomatous uterus measured 10 x 12 x 16 cm. Some of the cervical glands were dilated. In close proximity to one of the glands was an aggregation of minute glands some of which were branching. They were lined with cuboidal ciliated epithelium, and had round or oval nuclei situated near the centre of the cells. The picture instantly suggested commencing adenocarcinoma. The myomatous uterus in Case 12221 (Gyn. Path. No. 8832) measured 6 x 7 x 10 cm. The cervical glands had proliferated, forming many new and smaller ones. The cell proliferation had in places advanced so far that solid nests were formed. These resembled masses of squamous epithelium. At other points the surface epithelium had been replaced by typical granulation tissue.

In one of our cases we found very suspicious changes in the uterine mucosa which strongly indicated that a malignant growth was starting in the mucosa. In Case 3133 the abdominal cavity was occupied by a myomatous tumor, 36 x 32 x 32 cm. On histological examination some very interesting changes were found. In one gland the epithelium on one side was normal, but on the other side the nuclei were increasing in size. One of them was exceptionally large and circular and projected into the lumen of the gland. At other points were nuclei at least ten times the usual size. They stained very deeply and contained hyaline droplets. The stroma

surrounding these large cells showed marked small-round-celled infiltration (Fig. 1). The entire picture was suggestive of commencing carcinoma of the uterus. It will be noted that in each of these five cases the picture was suggestive of a beginning carcinoma, but in no instance was the evidence conclusive. In 2 of the 5 cases an inflammation of the cervix was present.

Carcinoma of the Cervix. In 18 cases carcinoma of the cervix was associated with uterine myomata. All of these cases will be described in detail in a forthcoming publication by Dr. Kelly and myself.

CONDITION OF THE MUCOSA LINING THE CAVITY OF THE UTERUS.

(*a*) Size and shape of the uterine cavity.
(*b*) Partial obliteration of the uterine cavity.
(*c*) Blood in the uterine cavity.
(*d*) Pus in the uterine cavity.
(*e*) Glands running parallel to the surface of the mucosa.
(*f*) Extension of the muscle into the mucosa.
(*g*) Alteration in the bloodvessels in the mucosa.
(*h*) Thrombosis of the veins in the mucosa.
(*i*) Unusual shape of the glands.
(*j*) Edema.
(*k*) Dilatation or hypertrophy of the uterine glands.
(*l*) Uterine polypi.
(*m*) Atypical changes in the epithelium lining the uterine cavity.
(*n*) A small myoma developing in the uterine mucosa.
(*o*) Endometritis.
(*p*) Tuberculosis of the endometrium.
(*q*) Adenocarcinoma.

(*a*) Size and Shape of the Uterine Cavity. The size and shape of the uterine cavity depends in great measure

on the size and situation of the uterine nodules. If a myoma develops in the upper part of the fundus the cavity may remain normal in size. If the tumor is intraligamentary it may reach very large proportions without causing the cavity to increase in size. On the other hand, when a myoma remains interstitial and reaches large proportions, with the gradual enlargement of the tumor there is a corresponding lengthening and often a broadening of the uterine cavity. The cavity may retain its normal shape, but if invaded by submucous myomata it becomes greatly distorted and may be very tortuous. The following cases give a fair idea of the various shapes and sizes the uterine cavity may assume: In Case 2919 (Gyn. Path. No. 380) the multinodular myomatous uterus measured 11 x 13 x 14 cm. The myomata were interstitial and subperitoneal. The cavity of the uterus was scarcely more than 1 cm. in length. It is difficult to account for such a small cavity in a patient only thirty-four years of age. The mucosa, however, was fully 1 cm. thick. In Case 12086 (Gyn. No. 8727) the myomatous uterus was 22 cm. in breadth and 12 cm. in its anteroposterior diameters. The uterine cavity formed a cavernous space 5 x 6 cm. Its walls could not drop together because the uterine cavity was literally paved with myomata so that there had resulted a non-collapsible space. The uterus in Case 5734 (Gyn. Path. No. 2034) was much enlarged being converted into a lobulated tumor 14 x 19 x 27 cm. The great increase in size was due chiefly to three subperitoneal myomata averaging 11 cm. in diameter. The uterine cavity was narrow and tortuous, approximately 10 cm. long and averaging 1.5 cm. in diameter. In Case 3491 (Gyn. Path. No. 713) the globular uterus measured 16 x 16 x 16 cm. Occupying the posterior wall and projecting into the cavity was a myoma 12 cm. in diameter. The uterine cavity was 13 cm. long and 9 cm. broad in its upper portion. The globular uterus in Case 5617 (Gyn. Path. No. 1962) was 22 cm. in diameter and resembled a pregnant organ. Situ-

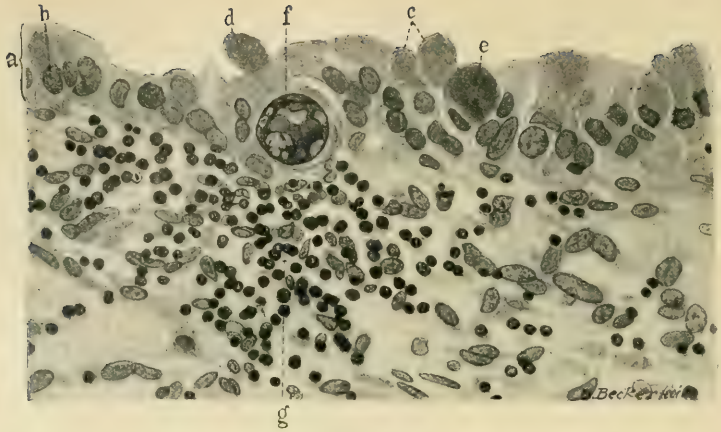

Fig. 1.—Suspicious epithelial changes in the mucosa of the cervix from a large myomatous uterus. (× 390.)

Gyn. No. 3133, Path. No. 494. *a* represents the normal thickness of the surface epithelium; *b* shows a nucleus of normal size; *c*, *d*, and *e* are granular masses of protoplasm of various sizes. They resemble miniature puff-balls and are devoid of nuclei; *f* is an exceedingly large nucleus containing aggregations of chromatin and large and small hyaline droplets. This nucleus is strongly suggestive of an early malignant change. Nature evidently fears trouble, as she is partially walling it off with many small round cells, *g*.

Fig. 2.—Thinning out of the mucosa over a submucous myoma. (× 5½.)

Gyn. No. 3008, Path. No. 435. *a* indicates the normal thickness of the mucosa and *b* the layer of muscle separating the submucous myoma from the mucosa. Toward the left the myoma becomes more prominent and the muscle and mucosa gradually become thinner until at *a'* all traces of the glands have disappeared and the mucosa is represented merely by the surface epithelium and a certain amount of underlying stroma.

ated in the anterior wall was a myoma 17 cm. in diameter. The uterine cavity was 22 cm. in length and 13 cm. in breadth at the fundus.

One of the largest uterine cavities we have ever seen was furnished by Case 3133 (Gyn. Path. No. 494). The uterus was pear-shaped, measuring 32 x 32 x 36 cm. The great increase in size was due to a myoma which occupied the anterior wall. The uterine cavity was 31 cm. long and varied from 9 to 14 cm. in breadth. Situated in the posterior wall about 12 cm. from the fundus was a yellowish area 3 cm. in diameter, and from this mucus mixed with blood escaped into the uterine cavity. This secondary cavity on histological examination was found to be lined with one layer of epithelium and seemed to be a markedly dilated gland.

The foregoing examples are sufficient to show that the uterine cavity may assume almost any size and shape, and, further, that the enlargement depends entirely upon the size and position of the myomata.

(*b*) Partial Obliteration of the Uterine Cavity. In a few of the cases in which submucous myomata are present the mucosa from the anterior wall is so firmly pressed against that of the posterior wall that the walls are becoming adherent and the mucosa over this area is disappearing. In Case 3008 (Gyn. Path. No. 435), for example, in which the multinodular myomatous uterus filled the pelvis, the uterine cavity, which was 6 cm. in length, had become partially obliterated by a submucous nodule which was situated in the anterior wall and had become adherent to a similar nodule in the posterior wall, thus giving the cavity an "X-shaped" contour. The uterine mucosa was normal, on the whole, but toward the point where the uterine cavity was partially obliterated the mucosa became somewhat atrophied, and that from the anterior wall fused with that of the posterior wall. The glands gradually diminished in number and then entirely disappeared, leaving only a small amount of stroma. This

finally disappeared and the muscle from the anterior wall became continuous with that from the posterior wall. At the point of junction were numerous bloodvessels, and the muscle showed small-round-celled infiltration. Still further toward the upper part of the cavity the mucosa gradually reappeared and near the top of the cavity regained its normal appearance. In Case 3111 (Gyn. Path. No. 479) the multinodular myomatous uterus measured 9 x 10 x 9 cm. The uterine cavity was 5 cm. in length. The mucosa covering the small submucous myoma in the anterior wall had become adherent to the corresponding mucosa of the posterior wall, thus partially obliterating the cavity. On histological examination it was found that where the nodule projected into the uterine cavity the mucosa suddenly became compressed and that from the anterior wall became directly continuous with that from the posterior wall. The mucosa became still more atrophied, and over the most prominent part of the nodule entirely disappeared. Here the muscle from the posterior wall was directly continuous with that covering the submucous myoma.

The line of fusion was still recognizable by a moderate infiltration with small round cells.

Coalescence of the uterine walls rarely occurs, but it is not infrequently simulated by submucous myomata, which greatly narrow the lumen of the cavity. In such cases they have merely pushed the mucosa in front of them without causing fusion with the opposite wall.

(*c*) Blood in the Uterine Cavity. As a rule, when the cavity of the uterus is opened little or no blood is found, but occasionally, as in Case 8738, the cavity will be found partially or completely filled with blood. In this case the contents were tarry masses and recent coagulated blood. If blood is present in the cavity the amount will depend upon the copiousness of the flow and the ease or difficulty with which it has been able to escape from the cervix.

(*d*) Pus in the Uterine Cavity. A definite pyometra is rarely associated with myomata, but occasionally at operation a small amount of pus is found in the uterine cavity. In Case 2098 the lower abdomen was filled with a myomatous uterus, and a small quantity of pus was found in the cavity. In Case 12439 the large multinodular uterus was adherent in the pelvis and also firmly fixed to a loop of small bowel. Both tubes were filled with pus. The cavity of the uterus contained pus. The uterine cavity had evidently long been the seat of an inflammation as the mucosa had been replaced by granulation tissue.

In all cases in which there is a foul discharge from the uterus any abdominal operation should be postponed until the discharge has been eliminated, as there is great danger of infection. Of course, in some cases immediate operation is imperative irrespective of risks.

THE MUCOSA.

If the myomata are so situated that the uterine cavity is not encroached upon nor enlarged, and provided the tubes are normal, it can, as a rule, be assumed that the uterine mucosa is normal. The mucosa may occasionally, however, be somewhat thicker than usual or in rare instances may be gathered up into irregular mounds which produce localized areas of very thick mucosa.

When interstitial myomata reach very large dimensions they usually cause a corresponding lengthening and broadening of the uterine cavity. The normal amount of mucosa must now cover an area sometimes twice, in other instances four or more times, as great as heretofore, and will naturally be only one-quarter of the usual thickness. If the myoma is small or of moderate size, it will generally become subperitoneal or submucous. If it passes toward the cavity of the

uterus the overlying mucosa gradually becomes thin (Fig. 2). This thinning out becomes more and more marked until finally little or no mucosa can be detected over the more prominent part of the tumor, and sometimes it is clearly evident even to the unaided eye that the prominent part of the tumor is totally devoid of a mucous membrane covering. When a myoma is small, the amount of tension on the mucosa is naturally not as great, and the tumor, even if pedunculated, may still have a liberal covering of mucosa. With the continued inward progress of the myoma the mucosa becomes thinner and thinner until all traces of the glands disappear and there is merely the surface epithelium and a zone of underlying stroma separating the myoma from the uterine cavity (Fig. 3). The stroma becomes more and more thinned out until only a few layers of stroma cells are interposed between the myoma and the surface epithelium. Finally, when the myoma projects far into the cavity, the mucosa may be represented merely by a layer of somewhat flattened epithelium resting directly on the myoma.

The next stage was so well seen in Case 8767 (Gyn. Path. No. 4959) that we will describe it in detail. The specimen consisted of a globular uterus averaging 15 cm. in diameter. The great increase in size was due to an interstitial myoma approximately 17 cm. in diameter, and occupying the posterior wall. The uterine cavity was 15 cm. in length and its mucosa averaged 1 mm. in thickness. At one point over the myoma the mucosa had entirely disappeared over an area 7 x 5 cm. (Fig. 4). The myoma here was dark brown in color and somewhat roughened. On histological examination the mucosa lining the uterine cavity was found to be perfectly normal, but near the denuded area it became thinner and thinner until nothing but surface epithelium remained. This disappeared and the myomatous tissue which had undergone hyaline transformation formed the surface. Scattered throughout the hyaline material were quite a number of polymorphonuclear

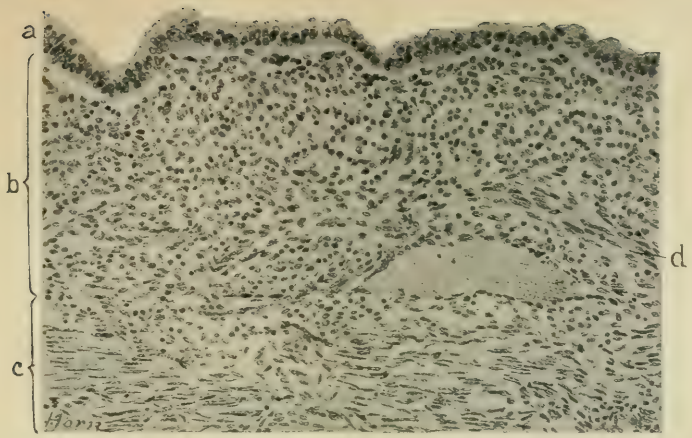

FIG. 3.—Atrophy of the mucosa over a submucous myoma. (× 140.) Gyn. No. 3218, Path. No. 539. The surface epithelium (*a*) is normal; *b* is the zone of underlying stroma devoid of glands; *c* is the muscle. The myomatous tissue lies immediately beneath this. A few strands of muscle are passing up into the stroma at *d*.

FIG. 4.—A submucous myoma almost devoid of mucosa. (× 4½.) Gyn. No. 3293, Path. No. 583. The surface epithelium (*a*) is all that remains of the mucosa. It rests directly on the myomatous tissue.

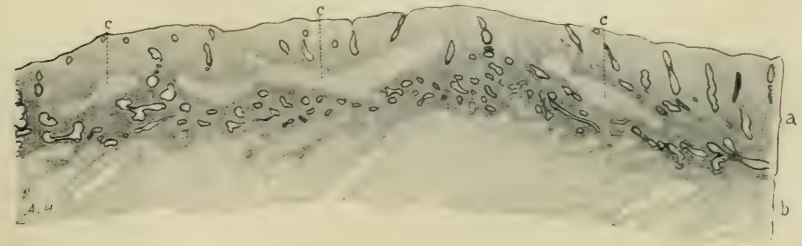

FIG. 5.—Marked dilatation of veins of the uterine mucosa. (× 11.) Gyn. No. 524. *a* is the mucosa; *b* the underlying muscle. The surface epithelium in the glands is normal, but the veins (*c*) are greatly dilated.

leukocytes. The next stage would be breaking down of the degenerated myomatous tissue with a speedy formation of a sloughing submucous myoma.

In some cases myomata are very abundant and literally fill the uterine cavity. In such cases the walls resemble a mosaic. Over the myomata the mucosa is very thin, while the spaces between the myomata are filled with mucosa which is often injected and much thickened. Case 2658 (Gyn. Path. No. 213) affords an excellent example of such a condition. The uterus was approximately globular, measuring 13 x 11 x 11 cm. Scattered throughout the walls were many small myomata. The uterine cavity was 5 cm. in length. Projecting into it from the top were two pedunculated myomata. The entire inner surface of the uterus was filled with myomata varying from 0.3 to 3 cm. in diameter. The intervening spaces were occupied by injected mucosa, which in one cleft reached 8 mm. in thickness. On histological examination the mucosa was in some places virtually absent and in others reached 8 mm. in thickness. That covering the submucous nodules over their most prominent portions was represented by one layer of cylindrical epithelium resting almost directly on the myomatous tissue. On passing away from the most prominent portion of these tumors the mucosa again regained its normal thickness.

In a few cases the thickened mucosa in the crevices between myomata showed typical gland hypertrophy.

(*e*) Glands Running Parallel to the Surface of the Mucosa. It is no uncommon thing to see the deeper portions of the glands running parallel with, instead of at right angles to, the surface. This is especially prone to occur over the less prominent portion of a submucous myoma. In such cases it seems that with the ingrowth of the myomata the deeper portions of the glands are pressed upward until they are at right angles to their superficial portion. This will only apply to a certain percentage of the cases, as we have

not infrequently seen this deflection of the glands where no submucous myomata were present.

(*f*) Extension of the Muscle into the Mucosa. It is a common occurrence to find one or more uterine glands extending a short distance into the muscle, especially if there is an adenomyomatous tendency, but extension of the muscle bundles into the mucosa is relatively rare. In Case 2852 (Gyn. Path. No. 347) some of the uterine glands were much dilated. The stroma of the mucosa showed moderate hemorrhage in its superficial portion and here and there bundles of muscle fibers extending into it. The picture in Case 3113 (Gyn. Path. No. 487) was even more marked. The mucosa was atrophied. The surface epithelium was intact. The glands were few in number and small and round on cross-section. The stroma of the mucosa showed considerable infiltration with small round cells, and non-striated muscle fibers were seen passing up into the stroma of the mucosa nearly as far as the surface epithelium.

(*g*) Alteration in the Bloodvessels of the Uterine Mucosa. In myoma cases, as a rule, the mucosa presents the usual appearance if the tumors do not encroach on the mucosa. Even if there be a marked projection of the tumor into the cavity, little or no change in the mucosa may be noted. In a moderate number of cases the mucosa is of a bright-red color, apparently due to congestion of the capillaries. More common are foci of ecchymosis. The ecchymotic spots, if recent, are bright red in color and appear as splotches of red. They are irregular in outline and sharply differentiated from the surrounding normal mucosa. Sometimes they are found in a mucosa of the normal thickness, but are more likely to be noted over the more prominent surface of a large submucous myoma. As the hemorrhagic areas become altered they change in color, being in turn dark red and then almost black. When the mucosa is exceedingly thin, dilated veins beneath the mucosa are often clearly visible. These veins are

frequently greatly increased in size when large myomata are present (Fig. 5).

On histological examination one frequently notes a marked abundance and dilatation of the capillaries in the superficial portions of the mucosa. In those cases in which ecchymosis has been noted there is usually much free blood in the stroma of the mucosa. This may be fresh or may show a moderate degree of disintegration. In most cases all trace of the hemorrhage then disappears, but occasionally a blood pigment remains. Thus in Case 3960 (Gyn. Path. No. 971) the uterine cavity was 3 cm. in length, 3 cm. in breadth, and its smooth mucosa presented numerous fine ecchymoses varying from 2 to 3 mm. in diameter. In sections from these areas the surface epithelium was intact and the glands were normal. The stroma of the mucosa showed small-round-celled infiltration, and there were deposits of pigment. In Case 3492 (Gyn. Path., No. 711) a myoma, 10 cm. in diameter, projected into the uterine cavity. Scattered throughout the mucosa were numerous patches of ecchymosis. On histological examination the mucosa covering the submucous myoma was found to be atrophic, and there was also edema. When the ecchymotic patches were noted large quantities of an almost black pigment were found in the stroma. This pigment occurred in irregular clumps or in minute specks. Whether it was contained in the cells or not it was difficult to determine. It is most exceptional to find any evidence of definite bleeding vessels in the mucosa. The surface epithelium is invariably intact, and the bleeding seems to be just a general ooze from the vessels into the mucosa without any especial injury to their walls. In all of the cases just described the hemorrhage was into the mucosa and the surface was smooth. In Case 7688, however, where the cavity of the uterus was distorted by an interstitial and submucous myoma, the mucosa showed large hemorrhagic areas which to a great extent were covered with fibrin and blood.

(*h*) Thrombosis of the Veins in the Mucosa. In Case 6667 (Gyn. Path. No. 2900) the patient gave a history of sudden hemorrhage four years before and afterward had had profuse bleeding each month. The cavity of the uterus was occupied by one large and two small myomata. On histological examination several large thin-walled veins of the atrophic mucosa were found thrombosed. In Case 8354 (Gyn. Path. No. 4539) the uterus was greatly enlarged as a result of subperitoneal, interstitial, and submucous myomata and the uterus contained a very large polyp. The mucosa lining the uterine cavity was very thin. Its surface epithelium was intact but flattened. The glands were small. The stroma showed slight infiltration. Occasionally we found a thrombosed vessel simulating, to a limited extent, a young tubercle. At one point, at least, the walls of the superficial veins had given way,[1] but the leak had been partially controlled by a thrombus (Fig 6).

(*i*) Unusual Shapes of the Glands Associated with Uterine Myomata. It has been noted that where myomata do not encroach upon the uterine cavity the cavity is usually of the normal size and, further, that the mucosa is, as a rule, normal in appearance and the uterine glands of the usual type. Even if a submucous myoma is present the only change in the mucosa will be a thinning out. In a few instances we have found unusual gland patterns. These changes consist in the sending off by the gland of one or more branches; sometimes five or six branches are noted. None of these pictures, however, in any way suggests malignancy.

(*j*) Edema of the mucosa is only occasionally met with. Edema is usually recognized by the succulent character of the tissue in which it is found and by the escape of serous fluid from the cut surface. The uterine mucosa has a glistening translucent appearance that might very readily be mistaken for edema when none exists. As a rule the diagnosis can be made only on histological examination. Edema

[1] This agrees with the previous findings of Dr. John G. Clark.

FIG. 6.—Rupture with subsequent thrombosis of a vein in the uterine mucosa over a submucous myoma. (× 100.)

Gyn. No. 8354, Path. No. 4539. *a* represents the remnant of the atrophic uterine mucosa covering the large submucous myoma; *b* is the underlying muscle. Occupying the upper part of the field is a large vein. The vein at *c* still contains normal blood, but at *d* is filled with a thrombus which reaches up and opens on the surface. There has undoubtedly been a recent hemorrhage from this vein.

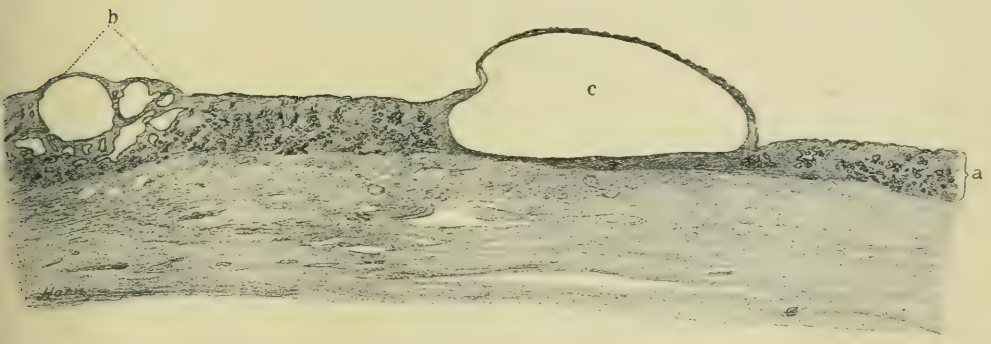

FIG. 7.—Markedly dilated uterine glands. (× 5.)

Gyn. No. 3232, Path. No. 543. *a* is the normal mucosa. At *b* the glands show cystic changes. The smaller cysts were irregular, the larger spherical. *c* is one of the markedly dilated glands. The surface epithelium is continued over it. All trace of the epithelial lining has disappeared from the inner walls of the greatly dilated glands, although still present in those showing only moderate dilatation.

of the mucosa is usually limited to the superficial portions and is absent near the muscle. It may be localized or uniform throughout the cavity. It occurs irrespective of whether submucous myomata are present or not. The surface epithelium is intact, and the glands are usually normal. The stroma cells are separated from one another by a granular material, which undoubtedly is coagulated serum. A certain amount of fibrin can also be demonstrated in some cases with Weigert's stain. Occasionally the exudate is exceptionally rich in albumin. It then forms a homogeneous mass that takes the eosin stain. When the edema is very pronounced not only is much serum poured out into the stroma but also into the glands, and the surface epithelium may be separated from the stroma by serum. Occasionally the lymph vessels in the underlying muscle may be dilated as in Case 4203 (Gyn. Path. No. 1116).

(*k*) Dilatation of the Uterine Glands. In a moderate number of myoma cases we have found slight dilatation of some of the uterine glands. The dilated glands may be present in any part of the cavity, but are more prone to occur where submucous myomata are present. The smaller ones are recognized as spherical cysts, 0.5 to 1 mm. or more in diameter, and filled with translucent or transparent contents. If the mucosa is atrophied these small cysts stand out prominently. They are also especially noticeable in uterine polypi. In rare instances the cysts become relatively large and project from the atrophied mucosa. In Case 3232 the uterine cavity was much increased in size, and the mucosa over a large submucous myoma had numerous cysts or blebs projecting from its surface. These cysts tended to arrange themselves in rows, had exceedingly thin walls, and ramifying over their surfaces were delicate traceries of bloodvessels. They were filled with clear limpid fluid. Occasionally the dilated glands contain small yellow bodies that float around in a clear fluid. These bodies usually consist of masses of exfoliated epithelial cells.

On histological examination it is found that the glands showing moderate dilatation have an intact cylindrical epithelium. They may be either empty or contain a granular detritus or a solid coagulum resembling a hyaline cast. When the glands become still more dilated the epithelium may yet retain its normal form, but is usually flattened (Fig. 7). In a few instances, as in Case 3437, the epithelium shows proliferation, being several layers in thickness. When great dilatation occurs the epithelium may entirely disappear. An example of apparently tremendous gland dilatation is furnished by Case 3133 (Gyn. Path. No. 494). The uterus was pear-shaped and 36 x 32 x 32 cm. The uterine cavity was 31 cm. long and varied from 9 to 14 cm. in breadth. Its mucosa was atrophied and projecting into the cavity from the upper part were three large polypi. Situated in the posterior wall about 12 cm. from the top of the cavity was a yellowish area 3 cm. in diameter. From this mucus mixed with blood escaped into the uterine cavity. This cavity had smooth walls. On histological examination marked atrophy of the mucosa was found. Most of the glands had disappeared. The cyst-like cavity near the middle of the uterus and communicating with the uterine cavity was lined with one layer of epithelium similar to that covering the surface of the mucosa. This cavity was in all probability a dilated uterine gland. The fact that it contained mucus, however, suggested the possibility of its being of cervical origin.

Gland hypertrophy was noted in several cases. When present it was usually associated with submucous myomata, and macroscopically it was noted that the mucosa was thicker than usual. The hypertrophic changes were almost invariably limited to the superficial layers of the mucosa (Fig. 8). As to the cause of gland hypertrophy we are in the dark. In Case 7795 (Gyn. Path. No. 4055), in which a right tubal pregnancy existed, the exciting factor was of course evident.

FIG. 8.—Gland hypertrophy in a cleft between myomatous nodules. (× 4.)

San., December 9, 1899. Path. No. 3674. The slightly irregular myomatous uterus measured 13 x 10 x 10 cm. Scattered throughout its walls were myomata, the largest 7 cm. in diameter. The uterine cavity was approximately 10 cm. in length, but much distorted and narrowed by submucous nodules. The mucosa was smooth over the submucous nodules, but was as thin as parchment, and where not subjected to pressure, reached from 2 to 3 mm. in thickness. On histological examination the mucosa presents an undulating surface and an intact surface epithelium. Over the prominent portion of the submucous myomata it consists merely of a narrow layer of stroma covered with epithelium but devoid of glands. In the protected areas the mucosa was much thickened. The picture represents such an area. At *c* and *c'* the surface epithelium rests directly on the muscle, but in the cleft becomes even thicker than normal. It shows typical gland hypertrophy, well seen at *a*. Some of the glands, as at *b*, are dilated; *m* is a small myoma.

(*l*) Uterine Polypi. On opening the cavity of a myomatous uterus one or more polypi were not infrequently found. These may be situated in any part of the cavity, but are more prone to occur in the upper part. Polypi were found in large and small myomatous uteri. The size of the organ seemed to have little or no influence on their development.

Some of the polypi were very small and appeared as little flat and yet sharply outlined elevations from the surface of the mucosa. They appear to be nothing more than small portions of the mucosa which are heaped up. As the polypi grow larger they become somewhat pedunculated. The majority have broad bases and are relatively thin, being not over 1 to 2 mm. in thickness. Nearly all of them point downward. The polypi in Case 3038 (Gyn. Path. No. 452), however, is one of the rare exceptions. This was 1.5 cm. long and 4 mm. broad; it was attached near the internal os and pointed upward. The polypi are usually smooth and consist of a whitish-yellow semitranslucent substance—uterine mucosa. Scattered throughout it one often sees small cystic spaces—dilated glands. The lower and free margins of the polypi are often deeply injected from hemorrhage into their dependent portions. The uterine mucosa surrounding the polypi may be of the normal thickness, atrophic or even show an increase in thickness. In a few cases the mucosa showed a definite tendency to gather into ridges or folds, but no definite polypi had developed. In Case 4955 (Gyn. Path. No. 1484) the globular uterus had a cavity 15 cm. long and 7 cm. broad. The mucosa covering the posterior wall was pale, smooth, and averaged 2 mm. in thickness. The surface was concave, having been subjected to pressure from a tumor occupying the anterior wall. Near the fundus the mucosa was gathered up into a broad flat mound 3 cm. in diameter and 1 cm. thick. Its margins were slightly injected.

Histological appearances of polypi from the body of the

uterus. Uterine polypi are nothing more than portions of the mucosa that have been partially extruded, and with the succeeding and frequent contraction of the uterus have been forced out into the cavity. If the uterine mucosa from which the polypi is nipped off is normal, then we should expect the polypi to consist of normal mucosa. The surface of the polypi is usually smooth. The majority of the glands present the usual appearance, but as a result of obstruction some of them tend to become cystic and their epithelium flattens. In the stroma or pedicle of the polyp non-striated muscle is not infrequently found. This is due to the fact that some of the muscle is drawn out with the mucosa as it is being extruded. The mucosa near the tip of the polyp often shows considerable hemorrhage. A few of the polypi show slight disintegration; the gland epithelium tends to drop off and the gland cavities are filled with hyaline-like casts, as was noted in Case 3113 (Gyn. Path. No. 487). When the uterine mucosa is the seat of gland hypertrophy the polypi will, as a rule, also show hypertrophy of the glands. This was especially noticeable in Case 12021 (Gyn. Path. No. 8502).

(*m*) Atypical Changes in the Epithelium Lining the Uterine Cavity. In addition to the cell changes found in endometritis and in cancer, we have also noted in a few cases a definite tendency for the surface epithelium to proliferate. In Case 3320 (Gyn. Path. No. 589), where the uterus was greatly enlarged as a result of subperitoneal and interstitial myomata, the epithelium covering the surface of the mucosa shows a slight tendency to proliferate being two or three layers in thickness at several points.

Proliferation of the surface epithelium was also noted in Case 3408 (Gyn. Path. No. 659) and in Case 6479 (Gyn. Path. No. 2700). Occasionally a small papillary growth may be detected arising from the surface of the mucosa. In Case 3133 (Gyn. Path. No. 494) the uterus was tremendously enlarged as a result of an interstitial myoma. The uterine

cavity was also greatly increased in size, being 31 cm. long and varying from 9 to 14 cm. in diameter. The mucosa was naturally greatly thinned out. About the middle of the cavity were delicate papillary outgrowths of the surface epithelium. In Case 3340 (Gyn. Path. No. 607) the uterus was the seat of subperitoneal, interstitial and submucous myomata, and the uterine cavity was 6 cm. long. The mucosa was somewhat atrophied. The surface epithelium was everywhere intact and in most places normal, but near the submucous myomata were three finger-like outgrowths of epithelium, and not far distant from these the surface epithelium had proliferated, being 3 or 4 layers in thickness. The newly formed cells stained more faintly than normal epithelial cells, and they were separated from each other by a moderate number of polymorphonuclear leukocytes. The uterine glands were normal. Were the mucosa lining all portions of the uterine cavity systematically examined histologically we feel sure that such alterations in the surface epithelium as we have noted would be much more frequently found. Some of them undoubtedly indicate a commencing malignant change, while others would advance no farther.

(*n*) A Small Myoma Developing in the Uterine Mucosa. In Case 5808 (Gyn. Path. No. 2101) the uterus formed a globular tumor 14 cm. in diameter. Projecting from its posterior surface was a subperitoneal nodule 4.5 cm. in diameter, and the anterior wall contained an interstitial and slightly submucous myoma 12 cm. in diameter. The uterine cavity was 12 x 11 cm. Its mucosa was atrophied and some of its glands dilated. Projecting into its cavity was a tongue-shaped polyp 3.5 cm. long, 1.5 cm. broad. On histological examination the mucosa apart from atrophy and gland dilatation was little altered, except at one point, where lying in the mucosa was a definite flattened myoma. This myoma apparently had originated in the mucosa, probably from some preëxisting muscle fibers that were located there.

(*o*) Endometritis. Inflammation of the endometrium has in our experience been relatively rare. About ten years ago I reported before the Medical and Chirurgical Faculty of Maryland the results of our examination of uterine mucosa for a period of four years. In that time we had noted 48 cases of endometritis. In other words, it was found on an average only once a month notwithstanding the large amount of material at our disposal. We were astonished at the infrequency with which it was encountered, and were still further surprised to find that even when the Fallopian tubes showed definite evidence of inflammation the endometrium was often unaltered. If an inflammation of the uterine mucosa does exist the excessive vascularity, together with the excellent drainage afforded by the more or less perpendicular position of the uterus, favors the speedy restoration to normal.

What applies to the endometrium in general is equally applicable in myoma cases. In our experience the mucosa rarely shows any inflammation when the uterus contains myomata. After carefully tabulating the cases in which there was an endometritis, usually very mild, we have found that with one or two exceptions the uterus either contained a submucous myoma, usually disintegrating, or the tubes showed definite evidences of a recent or old inflammation. These findings are of importance to the surgeon in that he can with almost certainty say that if the patient has no vaginal discharge and if the appendages are normal the uterine mucosa is unaltered. Knowing this he can open the uterine cavity if necessary, and be relatively certain that there is no danger of infection lurking there.

(*p*) Tuberculosis of the Endometrium. From the accompanying table it will be seen that we have had 7 cases in which, in addition to the myoma, tuberculosis of the endometrium was noted. In 6 of the cases the uterus was relatively small. Only in Case 3319 did it reach fairly large proportions. In two of the cases minute tubercles were

recognized on the surface of the uterus. In some of the cases involvement of the endometrium was early, in others nearly the entire mucosa was replaced by tuberculous tissue, and in Case 4965 the small uterine cavity was filled with creamy fluid. In Case 3319 the tuberculosis had extended to the muscle beneath the mucosa. In none of our cases, however, had the tuberculous process involved the myoma. In April, 1901, Dr. Homer Gage, of Worcester, Mass., sent us a specimen showing definite involvement of a myoma by tuberculosis. The interstitial myoma was approximately globular and 7 cm. in diameter. On section it presented a putty-like appearance and was very soft, fully three-quarters of the myoma showing this degeneration. Smears made by Dr. Gage yielded tubercle bacilli in moderate numbers. On making sections from the endometrium we found normal mucosa in places, but at other points the stroma showed small-round-celled infiltration, and at one point in the mucosa a definite tubercle was found. The myoma over a small area presented the typical appearance, but it was everywhere riddled by areas of caseation with surrounding zones of tuberculous tissue. All stages in the tuberculous process were demonstrable. Scattered throughout the myoma were a few islands of uterine mucosa. In other words, it was in part an interstitial adenomyoma. Both tubes were the seat of advanced tuberculosis. Just how the tuberculosis started in the myoma we are at a loss to say. It is well known that tuberculosis of the tubes is usually present where tuberculosis of the endometrium is found, and as seen from the table our cases closely followed this rule. In five both tubes were involved, in a sixth case one tube, and in only one case was there no evidence of tubal tuberculosis.

We must look upon the association of tuberculosis of the endometrium with uterine myomata as accidental.

TUBERCULOSIS OF THE ENDOMETRIUM ASSOCIATED WITH UTERINE MYOMATA.

Gyn. No.	Path. No.	Size of uterus.	Condition of tubes.	Endometrium.
3,319	592	15 x 17 cm.	Tuberculosis of both tubes.	Advanced tuberculosis. Commencing involvement of underlying muscle.
4,965	1499	4 x 3.8 x 3 cm. Myoma on surface, 5 cm. Cavity small, filled with creamy fluid.	Both tubes embedded in adhesions, but not tuberculous.	Early tuberculosis of endometrium.
6,991	3277	6 x 6.5 x 6 cm. Minute tubercles over surface.	Tuberculosis of one tube.	Early tuberculosis of endometrium.
8,220	4403	Slightly enlarged.	Tuberculosis of both tubes.	Early tuberculosis of endometrium.
9,636	5825	Myoma, 8 cm., in posterior wall.	Tuberculosis of both tubes.	Early tuberculosis of endometrium.
12,119	8714	7 x 8 x 7 cm. Several myomata on surface, the largest 14 x 11 x 11 cm. Minute tubercles on surface.	Tuberculosis of both tubes.	Tuberculosis of endometrium.
12,866	9755	7 x 8 x 8 cm.	Tuberculosis of both tubes.	Tuberculosis of endometrium.

(*q*) ADENOCARCINOMA OF THE BODY OF THE UTERUS. We have had quite a number of cases in which adenocarcinoma of the body of the uterus was associated with uterine myomata. These will be published in detail in the book on *Myoma* which Dr. Kelly and I have in press.

DISCUSSION.

DR. JOHN G. CLARK.—It is very essential for one to study carefully a paper like that which Dr. Cullen has presented before discussing it; nevertheless it is interesting to know of the many changes which take place in myomata, especially in the uterine mucosa. It is of special moment also to find that a careful laboratory study such as this of Dr. Cullen's almost always brings forth results of more or less use in the clinical study and treatment of cases. It is a pleasure to know that Dr. Cullen, in the course of his work, has con-

firmed a few observations I made in the laboratory with him several years ago concerning the mechanics of hemorrhage occurring in these cases.

I am interested particularly in the statement relative to the number of cases of carcinoma of the fundus occurring in conjunction with fibroid tumors of the uterus. Perhaps one statement Dr. Cullen made was merely a lapsus linguæ when he said, no doubt we would be surprised to find the large number of cases that have incident or co-incident carcinoma of the fundus rather than of the cervix. The natural impression would be, of course, that there would be a much greater frequency of carcinoma of the fundus rather than of the cervix, because of the mechanical traumatism exercised by these tumors on the uterine mucosa, and also because so many of these patients are sterile and consequently the lesions incident to lacerations of the cervix do not play any traumatic role. Therefore, my own a priori impression would have been along the line of his observations, namely, that carcinoma of the fundus is a more frequent coincidence of myomata than carcinoma of the cervix.

VENTROSUSPENSION AN UNSAFE OPERATION FOR POSTERIOR DISPLACEMENT OF THE UTERUS DURING THE CHILD-BEARING AGE.

By Edwin B. Cragin, M.D.,
New York.

Since the paper of Noble entitled "Suspensio Uteri, with Reference to its Influence upon Pregnancy and Labor," presented to the American Gynecological Society in 1896, and appearing in its printed transactions for that year, it has been recognized that a firm fixation of the uterine fundus to the anterior abdominal wall is followed, in a certain number of patients who subsequently become pregnant, by a dystocia perhaps so marked as absolutely to indicate Cesarean section.

For the present discussion two varieties of attachment of fundus to abdominal wall are recognized:

1. *A ventrofixation*, in which the fundus is sutured firmly to the anterior abdominal wall, the sutures passing through peritoneum, fascia, and muscle in addition to including a portion of the fundus.

2. *A ventrosuspension*, as recommended by Kelly, in which the sutures, aside from including a portion of the posterior wall of the fundus, pass through only the peritoneum and subperitoneal tissue of the abdominal wall, the object of this operation being the formation of a suspensory band or bands which will allow mobility of the uterus but not retroversion of it.

On looking over the literature of the subject, it is found almost impossible in many cases to determine whether the original operation for retroversion was intended to be a ventrofixation or a ventrosuspension. It is well known that in many cases in which a ventrofixation has been performed, *i. e.*, fundus firmly sutured to muscle and fascia of abdominal wall, the adhesion between fundus and wall has subsequently stretched so as to allow mobility of the uterus, and the result of the operation has been really a suspension.

On the other hand, it is the desire of the writer to emphasize the fact that an intended ventrosuspension may become a ventrofixation in ways which will be discussed later.

The anatomical results of pregnancy in a uterus firmly fixed to the anterior abdominal wall are fairly uniform:

1. The only part of the uterine body which develops and expands to accommodate the growing fetus is that behind the point of suture attachment to the abdominal wall.

2. The part of the uterine wall in front of and below the point of suture attachment thickens and hypertrophies, even to the extent in some cases of producing a muscular tumor obstructing the parturient canal.

3. The part of the uterine wall behind the point of suture attachment may become so thinned during pregnancy as to rupture during labor. This has been reported in at least six cases by von Guérard, Dickinson, Brodhead, Clark and Bowley, Edebohls, and Ingalls.

4. The cervix is thrown upward and backward, so that at full term it may be at the level of or above the promontory of the sacrum.

These are the anatomical results of pregnancy in a uterus the seat of a ventrofixation which has continued as such during the pregnancy, and, as has been suggested by Noble, the farther backward on the posterior uterine wall the suture attachment is made the greater the maldevelopment of the uterus in pregnancy and the greater the resulting dystocia.

The forms of dystocia which have been most commonly met with are:

1. A malpresentation of the child, especially a transverse presentation. This transverse presentation was noted in 15 of the 21 cases of Cesarean section for this condition collected by Lynch, and occurred in all 5 of the cases operated on by the writer and here reported.

2. An ineffectual labor with cervix undilated and high up. This high position of the cervix is noted in most of the cases demanding Cesarean section, and was present in all of my cases.

3. An obstructed labor, the obstruction being produced by the thickened anterior uterine wall.

It is freely admitted that many patients upon whom a ventrofixation has been performed have passed through pregnancy and labor without dystocia resulting therefrom. Up to three years ago it was my custom to perform ventrofixation or ventrosuspension for posterior displacement needing operation, and my records show 70 cases of ventrofixation or ventrosuspension, mostly the former, in which at least one ovary and tube were left, and hence the possibility of pregnancy preserved; yet so far as is known to me no dystocia has occurred in these cases, perhaps because the fixation sutures did not pass posterior to the centre of the fundus.

However, including the 5 cases reported in this paper, there are now at least 40 cases of Cesarean section on record which were demanded by a previous ventrofixation of the uterus. The profession is certainly ready to accept the statement that ventrofixation is an unsafe operation for a posterior displacement of the uterus during the childbearing age.

Let us now turn to the question of ventrosuspension.

Inspired by the favorable reports from this operation as performed in Kelly's clinic (Holden's investigation of 900 cases showing 83 subsequent pregnancies and no serious

dystocia), many operators are performing ventrosuspension under the impression that slight if any dystocia will result if pregnancy follows. The object of this paper is to call attention to the fact that a ventrosuspension is not a safe operation during the childbearing age, for the reason that an intended ventrosuspension may become a ventrofixation in one or other of the following ways:

1. The area of adhesion between uterine fundus and abdominal wall may be broader than expected and the resulting band be too firm to allow uterine mobility.

2. Infection of the abdominal wound may fix the fundus and anterior uterine wall firmly to the abdominal wall.

3. A ventrosuspension which allows a normal delivery in the first pregnancy following operation may subsequently become a ventrofixation and produce dystocia so marked as positively to indicate Cesarean section in the second post-operative pregnancy.

In the five cases of Cesarean section necessitated by ventrofixation, which the writer now desires to place on record, the operations for the retroversion were all performed by different men, and, save in the fifth, it is not known whether a suspension or a fixation was intended.

The Cesarean sections were all performed at the Sloane Maternity Hospital, N. Y. In the first case the firm fixation was evidently due to suppuration of the abdominal wound. This was shown by the broad cicatrix.

The histories and conditions found in the first four cases are so similar to those frequently reported that details will not be given.

The fifth case presents many interesting features, and is an important factor in support of the statement which forms the title of this paper.

Case I.—Mrs. G., aged twenty-seven years, birth No. 7285. Ventrofixation or ventrosuspension for retroversion performed four years before admission. Child lies trans-

versely; cervix high posteriorly; anterior uterine wall forms muscular tumor blocking parturient canal. Cesarean section performed May 30, 1898. Firm adhesions bound fundus and anterior uterine wall to anterior abdominal wall.

Case II.—Mrs. W., aged twenty-nine years, birth No. 13,314. Ventrofixation or ventrosuspension two years before admission. Cervix high up posteriorly; head in right iliac fossa. Cesarean section performed February 21, 1903. The posterior uterine wall was found attached to anterior abdominal wall by a firm adhesive band about two inches long and one-half inch thick, its uterine attachment being about two inches posterior to the middle of the fundus.

Case III.—Mrs. L., aged thirty-six years, birth No. 19,462. Ventrofixation or ventrosuspension performed several years before admission; child lies transversely; cervix lies high up to the left near level of umbilicus. Cesarean section performed April 17, 1907.

Case IV.—Mrs. S., aged thirty-two years, birth No. 20,367. Ventrofixation or ventrosuspension performed four years before admission; child lies transversely, cervix high up, delivered by Cesarean section October 23, 1907.

Case V.—Mrs. S., aged twenty-six years, birth No. 21,080. In October, 1902, a very able New York surgeon, realizing full well the obstetrical dangers of a ventrofixation, performed with great care a ventrosuspension for retroversion of the uterus. She was much benefited by the operation, and in March, 1903, about five months after the ventrosuspension, she became pregnant. On December 5, 1903, she was delivered by the writer after a very easy and rapid labor. Her first stage began with rupture of the membranes at 8 P.M., just as she was starting for the theater. The baby was born at 10.30 P.M. The position was L. O. A.

It was thought by the surgeon who performed the operation, by her attending physician, and by myself that the ventrosuspension had been a marked success and that no obstetrical complication from it need longer be feared.

In June, 1907, patient became pregnant again, and on the eve of March 26, 1908, the writer was again called to deliver her. On examination, the following conditions were found:

The cervix was high up posteriorly and with difficulty reached. The child lay transversely, and the anterior uterine wall was thickened as in the preceding cases. As no progress had been made on the following morning, she was taken to the Sloane Maternity Hospital and Cesarean section performed by me soon after her arrival. The suspension band, which in the first postoperative pregnancy allowed such normal uterine development and such a normal delivery, had in this pregnancy become thick and unyielding.

Whether as a result of the puerperal involution at the former labor (the puerperium was afebrile) or as a result of the present pregnancy, I know not. The condition was that of a ventrofixation, and a Cesarean section was the positive indication. If a ventrosuspension which in 1903 allowed a normal pregnancy and an easy labor can in 1908 become a ventrofixation requiring a Cesarean section, it seems to the writer that the profession should accept the statement that ventrosuspension is an unsafe operation for posterior displacement of the uterus during the childbearing age.

In the five Cesarean sections reported in this paper the mothers all recovered.

The baby in Case III died on the fourth day of multiple hemorrhages.

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DISCUSSION.

Dr. J. Whitridge Williams.—About eighteen months ago, at a meeting of the Southern Surgical and Gynecological Association, I reported my experience with this operation, and stated at that time I had done two Cesarean sections and had two very difficult cases in addition. One of these was a difficult version and extraction, and the other one ended after great difficulty in mutilation of the child, which was already dead when I saw it. The woman had the operation performed, but by whom I do not know. She fell into labor; everything seemed quite satisfactory; the position of the cervix was not extremely posterior, and after she had been in the second stage of labor for two hours I determined it was time to interfere. The cervix, which was possibly 5 cm. in diameter, was readily dilated, and on passing my hand up the cervical canal it went up four inches, 10 cm., and came in contact with a ridge of tissue separating the anterior portion of the uterus in two parts. In front of the partition lay the feet of the child, and it was impossible to reach them. My assistant tried and said he could not reach them. I also tried, but could not catch hold of the feet. We immediately cleaned the woman up, did a Cesarean section, and later removed the uterus. On examining this uterus afterward we found, contrary to the general rule, hypertrophy had occurred in the anterior as well as posterior wall of the uterus, and instead of the hypertrophy leading to thick muscular tissue it led to a more general hypertrophy, and this hypertrophy had buckled the anterior uterine wall between the cervix and the point of incision, raising it up in this manner (indicating), doubling on itself, and forming sacculation.

It is interesting to note that of these four cases of dystocia, one was a definite fixation done with catgut sutures. Who did it, I do not know. I do not know who performed the second operation. But in the other two cases the operations were done in the Johns Hopkins Hospital. These were suspensions of the uterus performed after Kelly's technique, either by Dr. Kelly himself or some of his assistants, and if there is any place where the operation ought to be done well it is there. It originated there, and at

first we thought it was a nice operation. But in two of these cases dystocia followed that operation, and as a result of that experience all of us in Baltimore have practically abandoned ventrosuspension and have taken up other methods of treating retrodisplacements of the uterus.

I thought it worth while to call the attention of the Society to these cases, as I do not believe that ventrosuspension is an operation to be performed with impunity upon a woman in the childbearing period.

Dr. Richard C. Norris.—Ventrosuspension has always been a popular operation in this community following Kelly's technique, and shortly thereafter the modified technique by Dr. Penrose. I have had many opportunities to deliver women who have been operated on in this community by that method. The first serious obstruction to labor was in a case reported years ago, the patient having been operated on by Dr. Noble, who did an anterior ventrofixation. Another case was operated on by Dr. Montgomery, which I have seen within the last year, in which there was a thick band of adhesion largely composed of muscular tissue, but pregnancy continued without interruption. The woman came to term; she had a normal presentation, and in consultation I delivered her with forceps, and after emptying the uterus was quite interested to feel beneath the abdominal wall a band of muscular tissue stretched from the fundus of the uterus down toward the abdominal scar. The thickness of this band was an inch and a half or two inches. It had allowed the uterus to continue its development throughout pregnancy, did not interfere with its contraction after labor, and the case was further interesting from the fact that during the puerperal involution of the uterus this muscular band underwent involution, and at a later period could scarcely be recognized.

I have delivered at the Preston Retreat thirteen cases following ventrosuspension, without interference with labor or pregnancy, but it is my opinion that the profession at large should be warned against ventrosuspension, and it should be abandoned as an operation on women who are likely to become pregnant. I have looked askance at it, and I believe when pregnancy and labor are not complicated in very many of those cases the band of tissue has been absorbed. In other words, ventrosuspension, which holds

the uterus forward for a sufficiently long time to enable the natural ligaments of the uterus to regain their tone, ceases as an active factor in the subsequent cure of the case, and it is practically analogous to that of a pessary. The operations which ordinarily interfere with pregnancy are really not ventrosuspensions, although they are aimed to be such, but are eventually fixations. The danger of suppuration of the wound is a factor which, of course, concerns the technique. I see but a small field for it, and I have abandoned it as an operation on childbearing women, believing that in a larger proportion of cases utilization of the round ligaments is a more rational operation. I have not done ventrosuspension on a childbearing woman for five years, but prefer the Alexander operation, or some modification of it. To sum up the situation, we are in a position to say that ventrofixation is absolutely to be debarred; that ventrosuspension is either a temporary operation, or its possible permanent effects are very often destroyed in cases of pregnancy pursuing a favorable course, and that it should be abandoned as an operation of choice in the childbearing period.

Dr. Edward P. Davis.—I have not so far had to do the Cesarean section operation following ventrofixation or ventrosuspension. I have, however, delivered a number of women by other methods who were previously operated on by this method of treatment, and I have seen some complications arising during pregnancy not only from interference with the development of the uterus, but also from interference with the position and function of the intestine during pregnancy. On one occasion the intestine seemed to become partially caught or occluded in its peristalsis, and at one time it seemed probable that an operation must be undertaken. I think the operation has no field in childbearing women. The operation of ventrofixation, not the operation of suspension, is uncertain, or if not uncertain likely to become a fixation as Dr. Cragin has said, and at all events it is uncertain and a dangerous thing.

Dr. Henry D. Fry.—I have had between thirty and forty cases of labor after ventrosuspension without any trouble, but I have had occasion to do Cesarean section for ventrofixation. This patient was operated on by my colleague,

Dr. Stone, for a ventrosuspension, and there was some suppuration in the wound. The uterus became fixed; the woman was in labor some time, and when I saw her the os was pointing posteriorly with a pad of muscular tissue in front, and I delivered her by Cesarean section. I believe now that a better method to deliver these women, instead of doing a Cesarean section, is to cut the bands or ligaments loose from the abdominal wall, let the uterus rise up in the abdominal cavity, and then if the case progresses normally you will have a normal labor. I would like to ask Dr. Cragin whether in any of these five cases he cut the band, or whether he left the uterus attached to the band?

Dr. Cragin.—I did not. I separated the attachment afterward.

Dr. Fry.—If you had not separated the attachment you might have had a recurrence of the trouble and another Cesarean section, but I believe if you cut the uterus loose, ligate the adhesions to prevent hemorrhage, the uterus will rise up in the abdominal cavity and the woman can be delivered normally. If Dr. Williams had done that in his case it would not have been necessary for him to have performed a Porro operation. I certainly believe, instead of doing Cesarean section in these cases, we should liberate the uterus and let the women have a normal labor at term.

Dr. W. Gill Wylie.—I recall very well when this operation was first done, and in all discussions in which I took part I approved it. In my early days I did quite a number of them, but have performed only one since at the time of the menopause, simply to see the effects. But in all later discussions I have taken this ground, and I take it today, that if a man were educated in the laws of physics and mechanics he would not perform that operation and never would have advocated it. The first operation was done around New York. I found three or four cases in which the operation had been done; I made a study of the cases, and have had a chance to operate on many of them. After listening to the demonstration of what takes place in the abdominal cavity, you can imagine a uterus suspended to the abdominal wall in the early operations, especially when the uterus is large, and you would realize that it is really suspended across the abdominal cavity; that its mobility

was lessened; that it was more or less fixed. There is more or less fixation, especially if the woman stands up and gravity carries the intestinal contents downward they would string over like wet clothes over a line. The uterus is lengthened. As I have said I studied many of these cases and, without exception, where there was more or less fixation, either of the fundus or suspension short enough to cause this pressure on the fixed uterus, the canal was gone. If you examine a patient in the Sims position, without touching the cervix, its canal would be found rather deep. When you take hold of the uterus with tenaculum and introduce a sound it would go in six or seven inches, so that the uterus was kept perpetually out of order from the fact of something abnormal having been done in fixing it. In studying the effect of gravity on intra-abdominal pressure there is no question as to the uterus being abnormally fixed, and that a good mechanic would not think of doing such an operation.

As to dystocia, I have seen several cases. I am satisfied hundreds of the cases that have had fixations and suspensions never became pregnant because of the abnormal condition of the uterus. I recall two or three women who have had their uteri fixed more or less high up, and while they could stand up they could not walk any distance with comfort. In lying down they would get comfort. Invariably the uterus was soft. I had supposed that this operation was practically obsolete, until I went down South and found that many cases had been operated on by the Kelly method, by his own men, whom he had trained to do these operations. I saw in one clinic recently three or four cases operated on, and I was utterly amazed to find that this operation was being done today. As has been said, suspension is only a temporary procedure.

The last letter I read before leaving New York was from a patient from Rock Hill, South Carolina, upon whom Dr. Kelly had operated some two or three years ago. At first the uterus was more or less fixed, but the constant effect of the uterus being stretched and kept out of its normal position had induced her to have me come there and remove her uterus. If you can imagine the effect of this clothesline across the abdominal cavity, with movable intestines and

other things fastened down, with thick omentum, the intestine resting on a uterus made more or less movable, you have a good idea of the condition. When such a woman stands up the uterus is held in abnormal position. The fixation of a movable kidney is abnormal and should not be done.

Dr. Seth C. Gordon.—I judge from the remarks that have been made that all these cases of ventrosuspension have been done by carrying the ligature through the top of the uterus, and not bringing it up through the abdominal wall. For eight years I have been doing what is known perhaps better as the Tod Gilliam operation, devised also by my assistant without knowing about Gilliam's operation, *i. e.*, carrying the round ligaments up through the rectus muscle on each side and fastening them there on top of the fascia, taking a pair of forceps, plunging it down through the rectus muscle, catching hold of the round ligament, bringing it up until the fundus is within two inches of the peritoneum, and fastening it there you have a suspension without interfering with the top of the uterus. I know of some cases where delivery has been effected without any trouble, and Dr. Thompson, who is now here, knows of no trouble arising from any case of pregnancy or delivery. There is no danger really of adhesion, so far as we know, and we have been doing this operation for certainly eight years, and no case has come to our knowledge where there has been any trouble following it. The uterus is simply held up there without much danger of it becoming adherent. I shall continue to do that operation until further advised. In some of these cases we cannot do anything else. These women suffer, and we do not like to have them wear a pessary all the time. All of the patients I have operated on in that manner have done well. The patients have been cured of their symptoms, and I believe it is the operation to be done.

Dr. A. Lapthorn Smith.—I have been a warm advocate of ventrofixation. When I first read a description of the operation, and of the back of the uterus being fastened to the abdominal wall so that the cervix pointed to the liver, I could not for the life of me see how a baby was going to be expelled from the uterine canal. I looked for some days, thinking that there must be a misprint in the description,

but no, it was all right, turning the uterus upside down and forming an attachment to the abdominal wall. Of 200 ventrofixations done by me, only one had a miscarriage, and about 15 have had a normal delivery. It is not an operation that is intended for women who are going to have children. There are two classes of cases. If there is retroversion, with the uterus fixed, then the tubes are diseased and should be removed, after which the uterus should be fastened firmly to the abdominal wall. This gives the most satisfaction. If it is movable do not open the abdomen, for there may not be anything the matter with the tubes and ovaries. Utilize the round ligaments by Alexander's operation, which only fails about four times in a hundred to secure a permanent cure.

Dr. Cragin (closing).—The point brought out by Dr. Williams that there is a folding of the uterus on itself in many cases, is borne out by the experience of many men. If the ligament is separated the uterus will in some cases apparently resume its normal shape.

I felt, as Dr. Norris feels, that in all probability from ventrosuspension there would be little if any dystocia, and I continued to do the operation much longer than I otherwise would for that reason; but having met with a few cases where ventrosuspension was intended and ventrofixation resulted with dystocia, demanding Cesarean section, I abandoned it as Dr. Norris has or will.

In regard to the remarks of Dr. Fry, and his suggestion of separating the ligament at the time of labor, the suggestion was made by Dr. Hardon to do that during pregnancy and labor, but it must be remembered that these cases had been in labor for a number of hours; that it was only after Nature had tried to dilate the cervix and deliver the child that the woman was brought to the hospital or was seen by me. When the fetal heart is overtaxed by labor, it is not good judgment to open the abdomen, sever the ligament, close the abdomen, and let the woman go on with labor. It would seem to me that the fetal mortality would be increased. I admit the feasibility of doing it during pregnancy; that is, separating the ligament and letting the uterus develop in a normal way; but as for doing it at labor it does not appeal to me.

I did not intend to bring into the discussion a substitute for ventrosuspension for posterior displacements of the uterus, but since Dr. Gordon has suggested the Gilliam operation, I will simply say that I sought the same harbor as he, and that ever since abandoning ventrosuspension I have been doing the Gilliam operation. I have had no dystocia from it, and it seems to me to fulfil the indications very nicely. My method of doing the operation is through the Pfannenstiel incision. I make a transverse incision, bring the round ligaments up through the recti underneath the fascia, making the suture which closes the outer ends of incision through the fascia include the round ligament, and closing the fascial incision as recommended by Pfannenstiel. As to the question of what steps were taken to prevent a recurrence of the trouble from ventrosuspension or ventrofixation, I closed over the raw surfaces just as accurately as I could with peritoneum; that is, separating the artificial ligament from the abdominal wall I closed over the raw space left by approximating the parietal peritoneum; then I excised the inner end of the ligament and closed over that raw surface by approximating the uterine peritoneum. In order to prevent a recurrence of the posterior displacement, I folded the round ligaments and shortened them at the same time I did the Cesarean section.

Dr. Davis.—You left the uterus in each instance?

Dr. Cragin.—Yes, sir.

IS PUBIOTOMY A JUSTIFIABLE OPERATION?

AN AFFIRMATIVE ANSWER, BASED UPON A PERSONAL EXPERIENCE IN THIRTEEN CASES.

By J. Whitridge Williams, M.D.,
Baltimore.

At our last meeting, Fry read a paper entitled "Pubiotomy in America," which was based upon twenty cases, including seven performed by me, and concluded that the operation had only a limited sphere of usefulness and should be employed only when Cesarean section was contra-indicated—after failure to deliver with high forceps or in an exhausted or infected patient. Likewise, Berny, after critically studying the twelve cases which had been reported in France up to the end of 1906, held that pubiotomy possessed but few advantages over symphyseotomy, and that time only could show what its future may be. On the other hand, the subject was the main theme considered at the German Gynecological Congress in 1907, and gave rise to a most extended and interesting discussion, the general consensus of opinion being that it was a most valuable operation and one destined to revolutionize the conservative treatment of labor complicated by contracted pelvis.

Since February 13, 1906, thirteen pubiotomies have been performed in my service, and I report my experience in the hope that it may aid some of us in determining whether the procedure is a justifiable one. I shall therefore discuss, in

the order given, my own results, the technique of the operation, its various complications, and, finally, its indications.

My Results. Upon analyzing the cases, nine of which were operated upon by me and four by my assistants, it is found that there were no maternal and three fetal deaths, although, as will be shown later, only one could fairly be attributed to the operation. (For full details the reader is referred to the list of cases at the end of the article.)

The following varieties of deformity were encountered: Six generally contracted rachitic, two flat rachitic, two generally contracted, and three funnel-shaped pelves. In the first ten pelves the conjugata vera varied from somewhat less than 7 to 8.5 cm., while in the three funnel pelves the transverse diameter of the outlet measured 7 cm. It should be noted that in the case histories I have given only the length of the diagonal conjugate, from which the true conjugate may be estimated by deducting 1.5 or 2 cm.

With the exception of Cases VII and IX, the operation was not undertaken until after the patient had been in the second stage of labor for from two to ten hours, and then only when advance of the presenting part failed to occur in spite of strong expulsive pains. In every case the vulva was dilated manually before beginning the operation, and the saw placed in position by Döderlein's technique, except in Case I, in which Gigli's open method was employed. As the operation was not undertaken prophylactically, but only after it had become apparent that spontaneous labor could not occur, delivery was effected immediately after severing the pubic bone, forceps being employed in ten and breech extraction in three instances.

In most cases there was a moderate amount of hemorrhage following section of the bone, but in Case V, which was associated with a deep communicating vaginal tear, it was quite profuse, and vigorous treatment was required to overcome the resulting shock.

Injury to the soft parts occurred less frequently and was less extensive than many of the reports would lead one to expect, notwithstanding the fact that nine of the thirteen patients were primiparæ. Fortunately, Case V was the only one in which the vagina was injured, but in this instance a deep tear, extending up the left side from the outlet nearly to the cervix, communicated directly with the pubiotomy wound. This occurred during the extraction, through an 8 cm. generally contracted rachitic pelvis, of a 4050-gram child which presented by the breech. In Cases XII and XIII slight tears occurred in the vestibule, but did not involve either the vaginal outlet or the urethra.

Considering the fact that nine of the patients were primiparæ, perineal tears occurred but rarely, being noted in only three instances. In Cases III and VIII they were of the first degree, and required, respectively, but one and two sutures for their repair. In Case V, to which reference has already been made, the deep, communicating vaginal tear was associated with a perineal laceration of the second degree. This, however, could scarcely be attributed to the operation, as it followed the breech extraction of a large child and might readily have occurred with a normal pelvis.

The bladder escaped injury in all cases, and at no time was the urine stained with blood. Catheterization was required for some days in Cases V, VIII, and XII, while in Cases XI and XIII it was necessary upon one or two occasions during the day of delivery.

Following the birth of the placenta, wounds of the vagina or perineum were repaired when present and all healed satisfactorily. After closing the upper pubiotomy incision with interrupted catgut sutures, and generally introducing a small drain of iodoform gauze through the labial opening, a broad band of adhesive plaster was passed around the patient's hips and served to immobilize the pelvis to some extent. Upon returning the patient to bed, she was placed upon a Bradford

frame, in order to facilitate handling, particularly during urination and defecation. The frame was uncovered for 12 or 15 inches, corresponding to the situation of the buttocks, so that upon elevating its lower end the genitalia became readily accessible for cleansing without seriously disturbing the patient. Except in the first few cases, no attempt was made to immobilize the patient, who was encouraged to move upon the frame as soon as she felt so inclined, and accordingly she usually began to lie upon her side within a few days after the operation.

It must be admitted that the course of the puerperium was not as smooth as might be desired, as in only six cases did the temperature remain below 100.5°, while in the other seven it varied between that point and 102.5°. None of the patients presented signs of serious infection, although Cases IV and V were quite sick, the former presenting considerable abdominal distention for several days, which disappeared as soon as the bowels moved satisfactorily, while the latter was the patient with the deep communicating vaginal tear.

On the other hand, most of the patients complained comparatively little, and were far less troublesome to care for than the reports of several American writers would indicate. Thus, my head nurse, who is a very intelligent observer, tells me that the after-care in such cases is somewhat more troublesome than with Cesarean section, but that the condition of the patients give rise to far less anxiety.

As soon as the woman has overcome the very natural feeling that she may burst open upon the slightest exertion, she will allow herself to be turned upon her side, and within a few days will move freely on the Bradford frame. Thus, one patient in the absence of the nurse got out of bed on the fourth day without injury to herself. Ordinarily, somewhere about the tenth or twelfth day the patients ask to be allowed to sit up, and a few days later are ready to leave their bed. With the exception of Case I, who was kept in bed for twenty-

nine days as a matter of precaution, the other women were allowed to get up at periods varying between the sixteenth and twenty-third days. They began to walk almost immediately, and were discharged in good condition between the twenty-fifth and thirty-seventh days; it being found on an average that they got up on the twentieth and left the hospital on the thirtieth day.

At the time of discharge, locomotion was very satisfactory, although several patients suffered from a slight limp, which soon disappeared. Ten of the women were seen later, and reported that they were perfectly well in every respect and were able to work as hard as before the operation.

The findings at the site of the bone wound were most surprising. In somewhat more than one-half of the cases more or less callus was felt upon the anterior surface of the pubic bone, while in the others no trace of it could be found. On the other hand, the posterior surface was invariably smooth, and no trace of the section could be discovered upon vaginal examination, except occasionally for a slight notch upon the upper and lower margins of the bone corresponding to the ends of the incision. That healing did not occur by bony union was shown by the fact that in four cases the cut ends of the bone could be felt to move upon one another when passive movements were imparted to the thighs. Except in Case I, no injury was done to the sacro-iliac joints, but in that instance a somewhat prominent and sensitive swelling was felt in front of each joint at the time of discharge, so that the promontory of the sacrum appeared to lie in a depression. This caused the patient no inconvenience, and had disappeared when she was examined one month later.

In view of the bearing upon the possibility of the occurrence of spontaneous labors in the future, it was attempted to determine in each case whether any enlargement of the pelvis had followed the operation. Careful pelvimetry at the time of discharge failed to reveal any change exeept in Case II, in which

the distance between the tubera ischii of a funnel-shaped pelvis had become increased from 7 to 8 cm.

In addition to the elevated temperature and the general discomfort which characterized the first days of the puerperium, several patients suffered from other complications. Thus, there was more or less edema of the vulva on the side of the operation in all cases, while in three it was so pronounced as to cause discomfort. In Cases I and IV a hematoma the size of a hen's egg developed in one labium majus, but did no particular harm, although in one instance it led to an induration which had not disappeared at the time of discharge. In Case VII, three days after getting up, a slight phlebitis developed in the left leg, but did not materially interfere with convalescence, as the patient was discharged on the thirty-seventh day with satisfactory locomotion. In another patient, Case X, the rise of temperature to 101.6° was probably due to a stitch infection at the upper pubiotomy wound, which healed by granulation. As has already been stated, there was no injury to the bladder, and prolonged catheterization was necessary in but three cases.

At a first glance it might seem that the loss of three children (Cases V, IX, and X) indicates that the fetal mortality was excessive, but when the histories are considered in detail it appears questionable whether any part of it can be fairly attributed to the operation. Thus, in Case V, a large child, 57 cm. long and weighing 4050 grams, was born asphyxiated after an easy and rapid breech extraction. Dr. Goldsborough, who performed the operation, is inclined to attribute its death partly to the fact that the patient took the anesthesia very badly and partly that stress of circumstances made it necessary to intrust the attempts at resuscitation to a student instead of one of the regular assistants. In Case IX the child was readily delivered after manual dilatation of the cervix in a prolonged dry labor, interference being indicated by beginning fever on the part of the mother. The head

was markedly moulded, but presented no signs of injury, and had pubiotomy not been performed, it would have appeared permissible to attribute the death to prolonged pressure upon the head. Likewise in Case X, the fatal issue was probably due to the prolonged labor, which lasted sixty-one hours, with a second stage of ten hours. In this instance delivery was readily effected, and the head presented no signs of injury.

Three of the patients have become pregnant since the operation, and one (Case IV) was delivered spontaneously at her own home of a seven-pound child, with a biparietal diameter of 8.5 cm. As the conjugata vera measured 7 cm., it is doubtful whether the favorable outcome was due to a readily malleable head or to some permanent enlargement of the pelvis.

Another patient (Case II) has become pregnant twice. The first pregnancy ended July, 1907, in spontaneous premature labor at the seventh month. The second is still in progress and two months from term, while the third patient (Case VII) is at present three months pregnant.

Technique. Thus far four methods have been described for performing the operation, namely, the open method of Gigli and Van de Velde, the partly subcutaneous method of Döderlein, the subcutaneous method of Bumm, and the subcutaneous symphyseotomy described by Zweifel.

The open method, in which the anterior surface of the bone is exposed by an oblique or vertical incision, appears to present but a single advantage over symphyseotomy, in that, by making the bone section somewhat eccentrically, the attachments of the bladder and urethra are less exposed to the possibility of injury. In a series of 77 open pubiotomies collected by Döderlein in 1907, the maternal mortality was 10.4 per cent., which is quite as high as that following symphyseotomy, and in marked contrast with the low mortality of subcutaneous pubiotomy. Accordingly, this method of operating

has been abandoned in favor of the several subcutaneous varieties, over which it possesses the single advantage of affording direct access to the bleeding vessels in the rare cases of excessive hemorrhage.

In Döderlein's method, before passing the curved needle beneath the pubic arch and through the labium majus, the soft parts are separated from the posterior surface of the pubic bone by a finger introduced through a small incision parallel to the upper margin of the bone and median to the pubic spine. In this way the bladder is protected from all injury during the application of the saw, while the upper incision scarcely takes away from the subcutaneous character of the operation. I employed this method in all but my first case, and have been so well pleased with it that I have not felt tempted to experiment with the purely subcutaneous technique.

In the latter operation, which was employed almost simultaneously in the clinics of Bumm and Leopold, and described in the articles of Stoeckel and Kannegiesser, no skin incision is made, but a large sharp-pointed needle is introduced through the outer portion of the labium majus, and, under the guidance of a finger in the vagina, is passed along the posterior surface of the pubic bone until its upper margin is reached, when by simply depressing the handle its point is made to emerge just median to the pubic spine. The Gigli saw is placed in position by withdrawing the needle, after which the bone is severed entirely subcutaneously.

It is apparent that this method is extremely simple, and reduces the possibility of infection to a minimum. At the same time, it is always associated with some danger of perforating the bladder by the sharp point of the needle, which cannot be entirely avoided by any of the devices which will be considered in the section upon the complications of the operation.

For this reason I have continued to employ Döderlein's technique, and the majority of speakers at the German

Gynecological Congress in 1907 also advocated its use upon the same grounds.

Zweifel, in 1907, reported twelve cases in which he performed subcutaneous symphyseotomy by cutting through the cartilage with a Gigli saw, which had been placed in position by means of a Döderlein needle introduced through a small vertical incision in the midline of the abdomen just above the symphysis. He obtained excellent results in all of his cases, and contends that the operation is superior to pubiotomy in that it facilitates fibrous union between the cut ends of the cartilage, and thereby increases the probability of a permanent enlargement of the pelvis and the occurrence of spontaneous labor in future pregnancies.

This operation is undoubtedly greatly superior to the typical open symphyseotomy, as is readily appreciated upon comparing its results with those described by Thies following fifty-three symphyseotomies performed in the same clinic, with a considerable maternal mortality, prolonged convalescence and frequently impaired locomotion. At the same time it is doubtful whether it presents any advantages over pubiotomy by Döderlein's method, as it would seem more likely to be complicated by injuries to the bladder and urethra. Judgment, however, should be deferred until a greater number of cases become available for comparison.

Whatever the technique employed, most of the German authorities, particularly Zweifel, Döderlein, and Bumm, strongly advise against immediate delivery of the child, on account of the supposed increase in the danger of deep vaginal and perineal tears. They advocate placing the patient in bed as soon as the bone has been severed, after closing the upper wound with sutures if Döderlein's method has been employed, and allowing the labor to proceed spontaneously, and interfere only upon the appearance of signs of danger to the mother or child.

On the other hand, all of my patients were delivered imme-

diately with very satisfactory results, and I am inclined to attribute the relative infrequency of deep vaginal and perineal tears to the fact that the vaginal outlet was widely dilated manually before beginning the operation, as will be described more fully in the following section. It must be admitted that prompt delivery is the ideal procedure, provided it can be safely effected. In this event the patient can be subjected to the test of labor and pubiotomy performed only when nature has shown herself unable to overcome the resistance after some hours of strong second-stage pains. Moreover, if the operation is undertaken sufficiently early to make it justifiable to wait for spontaneous delivery, it is apparent that one may be tempted to cut through the pubic bone in cases which would have terminated spontaneously had the operation been deferred until urgently demanded. For this reason, I am opposed to the frequent employment of the so-called prophylactic pubiotomy, although I am prepared to admit that it may occasionally be indicated in cases of prolonged dry labor, as in Cases VII and IX, in which complete dilatation of the cervix fails to occur, for the reason that it is not exposed to the pressure of the presenting part, which still remains arrested at the superior strait.

One of the great advantages of subcutaneous pubiotomy over the open method of symphyseotomy lies in the difference in the extent of gaping which occurs between the ends of the bone following its section. In the former the primary separation rarely exceeds 1 or 2 cm., while in the latter the cut ends immediately gape so widely as to expose the sacro-iliac joints to danger of rupture, unless the tendency to separation is counteracted by having the legs of the patient properly held by assistants. This is due to the fact that in pubiotomy the ends of the bone are held together by the overlying tissues and by the attachments of the larger muscles of the thigh. Consequently, greater gaping does not occur until the head presses into the pelvis, when the ends of the bone

separate from 3 to 5 or 6 cm., corresponding to the degree of disproportion. According to Sellheim, the enlargement of the pelvis is identical in both operations, but it is necessary to employ three times as much force to bring about the same degree of separation in pubiotomy as in symphyseotomy. For this reason, the extent of gaping in the former is proportionate to the resistance to be overcome, and consequently injuries to the sacro-iliac joints, with subsequent impaired locomotion, occur far less frequently than after symphyseotomy.

The care of the patient during the puerperium, and more particularly the decision as to whether it is necessary to attempt to immobilize the pelvis, will depend almost entirely upon the manner in which the healing of the bone wound is effected. Gigli, in his first communication upon the subject, believed that firm bony union occurred, and one of the arguments which he advanced in favor of pubiotomy was that healing would take place more readily and with less danger of infection in the bone than in a cartilage wound.

More extended experience, however, has shown that his belief was erroneous, and that in many cases, at least, true bony union does not occur, the ends of the bone becoming united by dense fibrous tissue, which may be more or less infiltrated with calcareous material. Thus, in a considerable proportion of cases, it is found on examination at the time of discharge that a considerable degree of motility exists at the site of section, as may be demonstrated by passive movement of the thighs or by having the patient take a few steps during vaginal examination. This may be the case notwithstanding the development of a layer of callus of varying thickness upon the anterior surface of the wound, and occasionally, even although *x*-ray photographs appear to indicate that firm bony union had occurred. Moreover, in several instances in which the operation has been performed a second time upon the same patient, the ends of the bone were found to be some distance

apart and united by fibrous tissue. Similar conditions were likewise noted by Oberndorfer, Cristofoletti, and others at autopsies upon women dying a year or more after the operation. As it has been shown that such a lack of ossification has no effect upon locomotion, it is apparent that the abnormalities in that regard, which sometimes follow symphyseotomy, could not be attributed to defective union, but were probably due to injuries sustained by the sacro-iliac joints.

As soon as it became recognized that lack of bony union did not interfere with locomotion or with the comfort of the patient, fibrous union came to be regarded as advantageous rather than otherwise; and, accordingly, many patients have been so treated as to encourage its formation in the hope that the fibrous tissue may become so softened and lengthened in subsequent pregnancies as to bring about considerable enlargement of the pelvis, and thereby permit spontaneous labor. For this reason, most German authorities do not attempt to immobilize the pelvis, but encourage the patient to move about in bed as soon as she feels so inclined. Consequently, it is not necessary to employ a specially constructed bed or hammock or to place the patient between sandbags, or to adopt any other expedient tending to hold the ends of the bone in apposition.

Thus far, I have employed a twelve-inch adhesive plaster bandage in my cases; but in view of the fact that others obtain equally favorable results without it, I shall discontinue its use in the future. As has already been indicated, we have found that the use of the Bradford frame greatly facilitates caring for the patient. It is not employed with any idea of immobilizing the pelvis, but simply to afford a convenient method of handling her.

From time to time modifications in the operative technique have been suggested in the hope that permanent enlargement of the pelvis might be secured and thus avoid the necessity for repeated pubiotomy in future pregnancies. For example,

Crede has proposed an osteoplastic operation, and Truzzi the interposition of a piece of calcined or decalcified bone, with the idea that after bony union had occurred the pelvis might remain permanently larger. Schickele, on the other hand, devised a step-like incision of the bone, which he thought would insure the formation of extensive fibrous union. It is as yet too early to judge of the value of such suggestions, but it nevertheless appears safe to predict that no modifications will receive general acceptance which require extensive manipulation and the abandoning of the subcutaneous principle of operating.

Complications Occurring during the Operation or Puerperium. *Hemorrhage.* When one considers that the crus of the clitoris is either severed when the pubic bone is divided, or torn through when the ends of the bone gape during the extraction of the child, a certain amount of hemorrhage must inevitably accompany every pubiotomy. Usually it is slight in amount and ceases spontaneously, as the lacerated vessels tend to bleed but little, while in other cases it promptly yields to compression. Thus, in only one of my series was it sufficiently abundant to cause alarm, and that was in the case associated with a deep communicating vaginal tear. Tandler suggested that the crus clitoridis be isolated and divided between sutures before severing the bone, but experience has shown that it is unnecessary, especially as it necessitates a large open wound; moreover, in the rare instances in which profuse hemorrhage follows this injury, it can readily be controlled by applying a few deep stitches through the tissues adjacent to the pubic arch.

In rare instances, however, profuse and even alarming hemorrhage may occur. In such cases it is usually due to injuries to the vesical plexus or to cutting through an aberrant branch of the internal pudic artery. If due to the former, it can usually be checked by compression applied both externally and through the vagina; but if due to the latter, the

entire wound must be laid widely open and the cut ends of the artery seized and ligated. As far as I am aware, Rosthorn has reported the only case of fatal hemorrhage following the operation, and which could not be checked by any resource at his command. I am inclined to believe that most of the serious hemorrhages which occur during the operation are due to deep communicating vaginal tears rather than to either of the factors just mentioned, and will therefore occur less and less frequently as we learn to prevent the occurrence of such injuries.

Injuries to the Soft Parts. The most serious of these are deep vaginal tears which communicate with the pubiotomy wound, thus doing away with every advantage arising from the subcutaneous technique. When the mutual relations between the vaginal walls and the pubic arch are considered, it is apparent that after the latter has been severed only a thin layer of tissue separates the vagina from the pubiotomy wound, and if the ends of the bone are widely separated before the vagina has become sufficiently dilated to accommodate itself to the stretching, deep communicating tears must occur through its wall. For this reason most authorities recommend that delivery be allowed to occur spontaneously, except in the presence of pressing indications, as they fear that the forcible extraction of the child through the undilated vagina will almost certainly lead to the production of a tear. Likewise, it is usually advised that the operation be practically restricted to multiparæ, and that the tension be relieved by deep lateral perineal incisions when immediate delivery becomes necessary.

I admit that these precautions were formerly justified, but at the same time I contend that they may be omitted and prompt delivery by forceps or extraction rendered as safe as spontaneous delivery, provided the perineum and vagina have been thoroughly dilated preliminary to the pubiotomy. For this purpose the gloved hand, folded in the shape of a cone

and well lubricated, is slowly passed into the vagina, which is gradually dilated until it will readily admit the closed fist, and after that still further dilated by the fingers of both hands placed back to back. By this means a degree of dilatation is obtained in a few minutes which is nearly comparable to that effected by the head of the child, and which secures such relaxation of the vaginal wall as enables it to accommodate itself without rupture to the rapid separation of the cut ends of the bone.

That this is the case is shown by the fact that a vaginal tear occurred in only one of my thirteen cases, nine of whom were pregnant for the first time. The same procedure also minimizes the frequency of perineal laceration, which was noted in only three of our cases. In two instances the tear was of the first degree, while in the other, which occurred in a multipara following the breech extraction of a large child, it extended down to, but not through, the sphincter. These results, which are eminently satisfactory, could hardly have been better in normal spontaneous labor or in ordinary low forceps operations, and clearly demonstrate the prophylactic value of preliminary manual dilatation of the vaginal outlet, as well as its superiority over deep perineal incisions.

Injury to the Bladder. Such lesions usually occur in one of two ways: either by the inability of the adherent bladder to follow the gaping pubic bone, or by its perforation with the needle. Both are much less liable to occur when Döderlein's technique is employed, as the preliminary separation of the tissues from the posterior surface of the bone markedly diminishes the possibility of the first mentioned accident, while the second can occur only when the needle is introduced subcutaneously. This is clearly shown by the fact that injuries to the bladder were not observed in my series nor in the twenty-five cases operated upon by Döderlein, while they were noted quite frequently in Bumm's series of cases. Naturally, they will occur less frequently when Stoeckel's suggestion

is followed of determining the location of the bladder before the operation by the use of the catheter, and making the section on the side of the pelvis not occupied by it; but punctured wounds cannot be entirely avoided as long as the needle is introduced entirely subcutaneously.

In view of the possibility of this accident, the patient should be catheterized after the delivery of the child, when the presence of blood-stained urine should lead to the diagnosis of a bladder lesion. If it be merely a puncture, spontaneous healing will usually follow if a retention catheter be used; but when the injury is more extensive, the bladder should be drawn up into the wound and the injury repaired by suture.

Hematoma. In a considerable proportion of the cases reported in the literature, convalescence was complicated by the development of a hematoma in the labium majus on the side of the operation. Unless the hemostasis has been absolute, hematomata will certainly occur and give rise not only to a certain amount of discomfort, but also predispose to infection, occasionally suppurate, and materially increase the probability of a phlebitis. Unfortunately, they represent one of the unavoidable complications of the operation and cannot always be avoided. They were noted in two of my cases, and in one instance underwent suppuration.

Phlebitis. Thrombosis of the vessels of the thigh on the side of the operation is likewise a not infrequent complication, and was noted in one of my cases. It is usually due to infection, associated with deep communicating vaginal tears, labial hematomata, or lesions of the bladder. That it is probably often due to unrecognized lesions of the bladder is shown by the fact that it ceased to occur, in Kroemer's experience, after the routine employment of the retention catheter during the first part of the puerperium.

Hernia. In rare instances, as reported by Franz, Hartmann, and Mann, hernias may later protrude through the pubiotomy wound. This was usually noted in cases which

had been complicated by suppurative processes, and particularly when an inguinal hernia already existed. According to Mann, it may be due to one of several factors: either to a diastasis through the lower part of the rectus muscle, to the absence of union between the ends of the pubic bone, or to stretching of the tissues uniting them.

Indications for Operation. As pubiotomy is undertaken principally in the interests of the child, its justifiability will depend entirely upon the maternal mortality and the rapidity of recovery following it. Consequently, its results will have to be compared with those following the induction of premature labor, symphyseotomy, and Cesarean section for the enlarged relative indication.

At the 1907 meeting of the German Gynecological Congress, Döderlein presented an analysis of 170 pubiotomies, reported by thirty-five writers, and performed either by his own technique or that of Bumm, with a maternal mortality of 4.1 per cent. In the discussion following his paper nineteen speakers gave their experience, aggregating 319 cases, with six deaths, a mortality of 1.88 per cent. This difference clearly demonstrates the improvement in technique resulting from increased personal experience, as the smallest number of operations reported by any one speaker was five, while the average was seventeen cases, and affords a marked contrast to the statistics of Döderlein, in which are included many isolated cases by individual operators. Moreover, Gigli, in a personal communication to Montgomery, stated that he had collected reports from nearly 300 operations, with a mortality of between 1 and 2 per cent., which practically became reduced to zero upon deducting the cases which were already infected when operated upon. Bumm, in the *Centralblatt für Gynäkologie* for May 9, 1908, stated that fifty-two operations had been performed in his clinic, with a single death from embolic pneumonia, a mortality of 1.92 per cent.

When it is considered that a considerable proportion of the

cases reported in the literature manifested signs of infection at the time of operation, which undoubtedly increased the number of deaths from that cause, a mortality of 2 per cent. should be considered as highly satisfactory, and should justify the prediction that in the future it will become materially diminished in the hands of experienced operators in judiciously selected cases.

It must, however, be admitted that even so small a mortality as 2 per cent. compares unfavorably with that following the induction of premature labor, which, in competent hands, should not exceed a fraction of 1 per cent. On the other hand, it should be remembered that with pubiotomy 95 per cent. of the children will be born alive at full term with excellent prospects of further development, as compared with 75 to 80 per cent. of poorly developed children following the induction of premature labor, from which must be further deducted the large number which will succumb in the succeeding months.

Accordingly, I feel very strongly that pubiotomy will eventually practically supersede the employment of the latter operation in the treatment of moderate degrees of pelvic contraction. Particularly as the figures just given do not adequately indicate its full advantages, for the reason that the knowledge that one possesses in pubiotomy, a satisfactory method of overcoming the disproportion between the size of the head and the pelvis will lead to the more extensive adoption of expectant treatment in such cases, with the result that 75 or 80 per cent. of the labors will end spontaneously at full term, while pubiotomy would probably not be required in more than one-fourth of the remaining cases. In this event, approximately only 5 or 6 per cent. of the women presenting moderate degrees of pelvic contraction would be exposed to the comparatively small dangers of pubiotomy; while, on the other hand, if the induction of premature labor were the recognized method of treatment, it would necessarily

be employed in a much larger proportion of cases—say 25 to 30 per cent. Consequently, the much more frequent employment of the latter operation, even with its comparatively low mortality, would probably lead to the death of as many women in a given series of cases as the less frequent employment of the more dangerous pubiotomy. Moreover, similar considerations applied to the child would still further accentuate the advantages of pubiotomy and place the results following the induction of labor in an even less favorable light.

Thus, assuming that the figures given above are approximately correct, and that two series of 1000 cases of moderately contracted pelves were treated by pubiotomy and the induction of labor, respectively, it would appear that the former operation would be required in 50 and the latter in 250 women; and that if the maternal mortality were, respectively, 2 and $\frac{1}{3}$ per cent. the number of deaths would be identical in both series. On the other hand, admitting that the fetal mortality were 10 and 25 per cent., respectively, 5 children would be lost in the former and 62 in the latter series. Or, to put the matter more forcibly, a greater number of children would have been saved had craniotomy been performed in all cases in which pubiotomy was indicated.

Naturally, it might be suggested by the advocates of the induction of premature labor that such calculations are not convincing. That they are not purely speculative, however, is demonstrated by the figures recently adduced by Bürger, which are based upon an analysis of 49,000 labors occurring in Schauta's clinic in Vienna. In this series there were 4240 contracted pelves, with a fetal mortality of only 2.2 per cent. in the cases in which spontaneous labor occurred; whereas, it rose 4.3 per cent. in the cases treated expectantly, including all deaths following craniotomy, pubiotomy, and Cesarean section, results which cannot be approximated by the most enthusiastic advocate of the induction of labor.

It seems almost unnecessary to compare the results following pubiotomy and symphyseotomy. It is generally admitted that the fetal mortality is identical in both operations, while the maternal mortality is 2 per cent. in the former as compared with 8 to 12 per cent. in the latter. Moreover, the convalescence is far less satisfactory and much more prolonged after symphyseotomy, as is conclusively shown by Thies' recent report upon the fifty-three operations performed in Zweifel's clinic.

Having shown that pubiotomy is superior to the induction of labor and symphyseotomy, it remains to consider to what extent it enters into competition with Cesarean section. In the first place, it must be stated that the former operation is not indicated when the conjugata vera measures less than 7 cm. Consequently, there can be no competition except in pelves above that limit, namely, in the so-called "borderline" cases, in which it is generally impossible to predict the outcome of labor in any given case. Moreover, it must be admitted that if the decision were based entirely upon the general mortality of the two operations, it would have to be given in favor of pubiotomy, as an analysis of the results of the best operators shows that the average mortality in Cesarean section is in the neighborhood of 5 per cent.

The researches of Reynolds, however, indicate that this figure does not altogether represent the true state of affairs, but that, admitting the competency of the operator and the excellence of his technique, the results will vary greatly according to the period of labor at which the operation is performed. Thus, in an analysis of 289 cases, he found that the mortality was 1.2, 3.8, or 12 per cent., respectively, according as the operation was performed during the last days of pregnancy, or early or late in labor. As his results are in accordance with my own experience, I feel justified in holding that the results of Cesarean section performed just before or at the very onset of labor are superior to those of pubiotomy, both

as regards the actual mortality and ease of convalescence of the mother, not to mention the fact that all of the children are saved, instead of only 95 per cent., as in pubiotomy. On the other hand, Cesarean section performed early in labor has a somewhat greater mortality than pubiotomy; while, if not resorted to until the second stage is well advanced, there can be no comparison between the two operations, as the former has a mortality of 10 or 12 per cent. and the latter of only 2 per cent.

Accordingly, if it were possible to predict in a given case that engagement would not occur, the best interests of both the mother and child would be served by performing Cesarean section at an appointed time a few days before the expected date of confinement; as by so doing the child would certainly be saved, with a minimal risk and an almost ideal convalescence for the mother. Unfortunately, in the class of pelves under consideration, such a prediction is never possible in women pregnant for the first time, and only exceptionally in multiparæ. Therefore, in primiparæ Cesarean section would not be indicated at the time of election, unless one were willing to assume the responsibility of operating unnecessarily upon a considerable number of women, when one knew by experience that a large proportion of them would be delivered spontaneously if subjected to the test of labor. For this reason, early elective Cesarean section would be justified only in multiparæ in whom the history of previous labors had clearly indicated that Nature was habitually unable to overcome the disproportion between the size of the head and the pelvis.

On the other hand, if Cesarean section is not done at the very onset of labor, I consider that the best interests of the patient will be served if she be treated expectantly, allowed to go into the second stage of labor, and then subjected to pubiotomy, if engagement does not occur after several hours of strong pains, or in the presence of certain conditions which indicate the necessity for prompt delivery. Under such cir-

cumstances, Cesarean section is a dangerous operation, and, while it may save a few more children, exposes the mother to a risk five or six times greater than if pubiotomy had been employed, and therefore does not seem to me to be justifiable.

To my mind, the great advantage of pubiotomy in the treatment of border-line cases of pelvic contraction consists in the fact that it affords the possibility of subjecting the patient to the test of labor in suitable cases and then of interfering for the sake of the child without subjecting the mother to too great danger. In other words, it enters into competition with high forceps, prophylactic version, and craniotomy rather than with Cesarean section.

I have repeatedly stated that its lowest limit should be placed at a conjugata vera of 7 cm., but unfortunately its upper limit cannot be so readily given; and while, generally speaking, the operation will rarely be indicated when the conjugata vera exceeds 8.5 cm., it may occasionally become necessary in larger pelves. Indeed, it may be said that its upper limit cannot be defined, and that the operation justified in any case, no matter what the pelvic measurements may be, in which a prolonged test of labor demonstrates that the uterine contractions are unable to overcome the disproportion. For this reason, it may be indicated in practically normal pelves when the child is unusually large, as well as in certain cases of brow and mentoposterior presentations in which version is contra-indicated.

In addition to the well-known varieties of pelvic deformity, it may also find a considerable field of usefulness in certain cases of outlet contraction or funnel pelvis, as has been shown by the experience of Van de Velde and myself. In such cases the indication is afforded not merely by a certain degree of shortening in the distance between the tubera ischii, but only after a most careful study of all the measurements concerned, and particularly of the anterior and posterior sagittal diameters of the outlet, to which I have directed attention in the appropriate chapter of my text-book.

Cases.	Pelvis.	Measurements.	Para.	Presentation.	Abnormality of.	Indications for interference.	Duration of second stage.	Mode of delivery.	Gaping.	Amount of hemorrhage.
1	Gen. contr.	D.C., 10.5 cm.	III	L. O. T.	....	Large child.	5 hrs.	Forceps.	5 cm.	Some.
2	Gen. contr.; funnel.	D.C., 10.0 cm. Trans. outlet 7 cm.	0	L. S. A.	Frank breech.	Pelvis.	2 hrs.	Extraction.	4 cm.	No.
3	Gen. contr.; rachitic.	D.C., 8.75 cm.	0	L. O. T.	Posterior parietal.	No advance.	3 hrs.	Forceps.	?	No.
4	Flat; rachitic.	D.C., 8.5 cm.	0	R. O. T.	....	No advance.	3 hrs.	Forceps.	3–4	Some.
5	Gen. contr.; rachitic.	D.C., 9.75 cm.	I	L. S. A.	Frank breech.	No advance.	3½ hrs.	Extraction.	?	Marked.
6	Gen. contr.; rachitic.	D.C., 9.5 cm.	0	L. O. A.	....	No advance.	3 hrs.	Forceps.	4 cm.	No.
7	Gen. contr.; rachitic.	D.C., 8.75 cm.	0	L. S. A.	Premature rupture of membranes and prolapse of foot.	Manual dilatation; cervix ⅔ dilated.	...	Extraction.	6 cm.	Moderate.
8	Gen. contr.; rachitic.	D.C., 9.5 cm.	0	R. O. P.	....	Did not engage.	3 hrs.	Forceps.	5–6	Very little.
9	Flat; rachitic.	D.C., 10.5 cm.	I	R. O. T.	Posterior parietal.	Exhaustion. Dry labor. Fever.	Manual dilatation.	Forceps.	3 cm.	Very little.
10	Gen. contr.; rachitic; coxalgic.	D.C., 9.75 cm.	0	L. O. T.	Posterior parietal.	Very slow labor.	10 hrs.	Forceps.	?	None.
11	Funnel.	Trans. outlet 7 cm.	0	L. O. A.	Arrest below spines.	Funnel pelvis.	2½ hrs.	Forceps.	4–5	None.
12	Gen. contr.	D.C., 10 cm.	0	R. O. T.	Posterior parietal.	No engagement.	3 hrs.	Forceps.	5 cm.	Slight.
13	Gen. contr.; funnel.	D.C., 11 cm. Trans. outlet 7 cm.	I	L. O. T.	....	No descent.	2 hrs.	Forceps.	5 cm.	Very little.

I desire to emphasize the fact that if good results are to be obtained, pubiotomy should be regarded as a primary operation, and should not be resorted to after the failure of high forceps or version. If delivery be urgently demanded in such cases, I feel that it is better to perform craniotomy than to subject the mother to any risk for the sake of a child whose life has already been compromised. Moreover, I feel that it should not be employed in cases of infection, as a large part of the fatal results recorded in the literature have occurred in that class of cases. At the same time, it may be permissible when the temperature is slightly elevated, but definite signs of infection are not present, as in Case IX; but even under

Vaginal tears.	Perineum.	Other injury.	Hematoma.	Catheter.	Highest temp.	Out of bed.	Discharged.	Locomotion.	Motility.	Child.	Weight.	Remarks.
						Days.	Days.					
No	No.	No.	Yes.	No.	100.7	29	36	Excl.	Yes	+	4055	Transient injury of sacroiliac joints.
No	No.	No.	No.	No.	100.2	...	32	Excl.	Yes	+	2660	Now pregnant; outlet widened 1 cm.
No	Slight, 1 suture.	No.	No.	No.	100.5	...	37	Excl.	No	+	2415	Pressure mark from promontory.
No	No.	No.	Yes.	No.	102.0	18	23	Excl.	No	+	3220	Spontaneous labor January 12, 1908.
Yes	Second degree.	No.	No.	Yes.	102.2	23	30	Excl.	No	D.	4050	Patient quite shocked at operation.
No	No.	No.	Edema.	No.	101.5	17	28	Excl.	No	+	3230	Not seriously sick.
No	No.	No.	No.	Yes.	102.4	16	27	Excl.	Yes	+	3040	Slight phlebitis on the eighteenth day.
No	Slight, 2 sutures.	No.	Edema.	No.	100.2	18	35	Excl.	No	+	2450	Easy recovery.
No	No.	No.	No.	No.	101.5	22	25	Excl.	No	D.	?	No apparent reason for child's death. Delivery easy.
No	No.	Infection of upper wound.	No.	No.	101.6	23	29	Excl.	No	D.	3410	Second stage too long. Delivery very easy.
No	No.	No.	No.	Once.	99.5	20	25	Excl.	Yes	+	3275	Typical recovery.
No	No.	Deep tear in vestibule.	No.	First day.	102.5	20	26	Excl.	No	+	3250	Good recovery.
No	No.	Slight tear in vestibule.	No.	Yes.	99.5	20	25	Excl.	No	+	3820	Typical recovery.

such circumstances I believe that the prognosis is markedly impaired.

Finally, I wish to go on record as stating that I do not consider that pubiotomy is an operation for the general practitioner; for, although it is usually readily performed, it may at any time lead to serious complications, which will tax to the utmost the resources of even an experienced operator.

CASE HISTORIES.

CASE I.—McCoy, Obst. No. 2484. Colored V-para, aged twenty-six years. Generally contracted rachitic pelvis:

23.5, 24.75, 30, 19.5, and 10.5 cm. Pubic arch wide; transverse of outlet, 10.5 cm. Has had three spontaneous labors at term and two macerated children at about the seventh month.

The child lay in L. O. T., and was apparently of large size. The first stage of labor lasted nineteen hours; and after five hours of strong second-stage pains, only a small segment of the head had become engaged. As there was apparently no probability of the occurrence of spontaneous labor, pubiotomy was determined upon.

Operation, February 13, 1906. Left-sided pubiotomy by the open method; forceps applied to the sides of the head. On making traction, the ends of the bone gaped for 5 cm. and the child was readily delivered. There was considerable hemorrhage from the pubic wound, which was controlled by compression. No injury to the perineum, vagina, or bladder. The cutaneous wound was closed by formalin catgut sutures, several of which included the periosteum. Drainage of labial wound. The child was born in good condition, weighed 4055 grams, and presented the following head measurements: 15, 12.5, 10, 9.5, and 8.5 cm.

The puerperium was uneventful, the highest temperature being 100.7° on the day of delivery. Catheterization was not necessary. There was considerable swelling of the left labium majus, due to hematoma formation. The patient was out of bed on the twenty-ninth day, walked on the thirty-first, and was discharged in good condition on the thirty-sixth day. At that time the wound over the pubis was found to be healed by first intention, though the left labium majus was still considerably indurated. The outer surface of the pubis presented a slight depression at the site of the section, while its inner surface was smooth and no trace of callus could be detected. There was a painful thickening in front of each sacro-iliac joint, which was more marked on the right side. This projected 1.5 cm. beyond the surface, so that the

promontory of the sacrum seemed to lie in a depression. Locomotion was very satisfactory, although there was definite motility at the pubic wound. Vaginal examination showed: outlet excellent; cervix, slight stellate tear; uterus forward, movable, and well involuted; appendages negative.

The patient was seen again one month after the operation, when all trace of the swelling about the sacro-iliac joints had disappeared, except for a slight non-sensitive ridge on the left side.

Case II.—Hupka, Obst. No. 2553. White I-gravida, twenty years old. Generally contracted, funnel-shaped pelvis: 23, 26, 30, 18.25, and 10 cm. Pubic arch very narrow, transverse of outlet 7 cm.

I saw patient in consultation after she had been in labor for fourteen hours, and found the cervix fully dilated and a fair-sized child presenting at the superior strait in L. S. A. frank breech. In view of the combination of breech presentation and funnel pelvis, it was thought best to perform pubiotomy. The patient was therefore sent to the hospital and the operation begun one and one-half hours later. During this interval there had been no descent, in spite of strong pains.

Operation, April 13, 1906. Preliminary manual dilatation of vaginal outlet, pubiotomy by Döderlein's method on the left side. The anterior foot was brought down and extraction readily effected, during which the cut ends of the bone gaped 4 cm. There was almost no hemorrhage. The perineum and vagina were not torn. After expressing the placenta, the upper wound was sutured, and an adhesive plaster bandage applied about the pelvis. The child was born in good condition, weighed 2660 grams, and presented the following head measurements: 12.5, 11.5, 10, 9.5, and 7 cm.

The puerperium was uneventful, except for a slight abdominal distention on the fourth day. Highest temperature, 100.3°. The patient's only complaint was that she was

compelled to lie in one position. She sat up on the twenty-fourth day and was discharged on the twenty-second day, when the following conditions were noted: Outlet, excellent; cervix, very slight transverse tear; uterus forward, movable, and well involuted; appendages normal; locomotion excellent. Large callus on anterior, but no trace of the wound palpable on posterior surface of pubis; sacro-iliac joints clear. The pelvic measurements were unchanged, except that the transverse of the outlet had been increased 1 cm.

Patient returned to the hospital January, 1907, two months pregnant, and stated that she had had no trouble since her discharge. Examination showed slight motility at the site of the operation. This pregnancy ended spontaneously at the seventh month. She reappeared May 10, 1908, and stated that she was again between seven and eight months pregnant, felt perfectly well, and arranged to return to the hospital for delivery.

Case III.—Adams, Obst. No. 2501. Colored I-gravida, aged sixteen years. Generally contracted rachitic pelvis: 23.25, 22.75, 28, 16.5, and 8.75 cm. Pubic arch wide, transverse of outlet 10 cm.

The child lay in L. O. T. Total duration of labor thirty-two and a half hours. As there was no advance after three hours of strong second-stage pains, and the head still at the superior strait in the posterior parietal position, pubiotomy was determined upon.

Operation, July 2, 1906. Typical left-sided Döderlein pubiotomy, preceded by manual dilatation of the vaginal outlet. Easy delivery with forceps. No note as to extent of gaping. Slight hemorrhage; no vaginal and a very slight perineal tear, which required one suture for its repair. The child was born alive, weighed 2415 grams, and presented the following head measurements: 13.25, 11.5, 8.5, 8.25, and 7.75 cm. The head was markedly moulded, presented an extensive caput and a deep depression where the posterior parietal bone had pressed upon the promontory of the sacrum.

The puerperium was uneventful, the highest temperature being 100.5° on the seventh day. Catheterization not necessary. She was kept in bed for four weeks and was discharged on the thirty-seventh day. At that time the outlet was excellent; cervix not torn; uterus retroflexed and adherent; appendages not felt; locomotion excellent. No sign of callus upon either anterior or posterior surface of pubic bone or at sacro-iliac joints.

The patient returned for inspection December 19, 1907, and stated that she had since been operated upon for the displaced uterus. Examination showed a slight callus on the anterior surface of the pubic bone, but no trace of the wound posteriorly. Sacro-iliac joints normal. No subjective symptoms except for slight cystitis following suspension of uterus.

Case IV.—Stewart, Obst. No. 2763. Colored I-gravida, aged nineteen years. Flat rachitic pelvis, with double promontory: 25.75, 26.25, 31.25, 17.5, and 8.5 cm. Pubic arch wide, transverse of outlet 10.5 cm. Child in R. O. T.

The patient was sent into the hospital from the out-patient service, after having been in labor for fifteen hours, with the cervix 4 cm. in diameter. Eight hours later the membranes ruptured, and examination showed the cervix fully dilated, but the head not engaged. As there was no advance after three hours of good second-stage pains, pubiotomy was determined upon.

Operation, October 25, 1906. Typical, left-sided Döderlein pubiotomy, by Dr. Goldsborough. Immediately after severing the pubic bone the head descended to the level of the ischial spines; easy midforceps delivery, during which the ends of the bone gaped 3 to 4 cm. There was but slight hemorrhage and no perineal or vaginal tear. The child was born alive, in good condition, weighed 3230 grams, and presented the following head measurements: 13.15, 11.25, 9.25, 8.5, and 7.5 cm.

The puerperium was somewhat disturbed. There was

marked abdominal distention on the third day, when the pulse reached 140, and the temperature 102°. The patient was quite sick until the bowels moved, after which her condition became satisfactory. There was some edema and a small hematoma of the left labium majus. At no time was catheterization necessary. She was out of bed on the eighteenth day, and was discharged on the twenty-third day.

On discharge the outlet was excellent; cervix, slight bilateral tear; uterus, retroflexed, movable, and well involuted; appendages negative. Considerable callus on the anterior surface of the pubic bone, but no trace of it posteriorly. No motility on passive movements of thighs. Walks without pain.

January 13, 1908, the patient was delivered spontaneously at her own home of a child weighing seven pounds, which presented the following measurements: 13.5, 11.25, 9.25, 8.5, and 7.5 cm. Puerperium normal and locomotion perfectly satisfactory.

Case V.—Anderson, Obst. No. 2728. Colored I-para, aged twenty-four years. Generally contracted rachitic pelvis, 22, 22.75, 25, 15, and 9.75 cm. Pubic arch wide, transverse of outlet 10.5 cm. Marked false promontory of sacrum. Previous pregnancy ended at seven months.

Patient did not learn to walk until she was seven years old. Child presented in L. S. A. frank breech. Slight contractions for three days, definite pains, however, began 5 p.m., November 26, 1906, and the membranes ruptured spontaneously at 9 p.m., when the cervix was almost fully dilated. As there was no advance three and a half hours later, pubiotomy was determined upon.

Operation, November 27, 1906, Dr. Goldsborough. After manual dilatation of the vaginal outlet, left-sided Döderlein pubiotomy. Extraction easy and rapid, but the amount of gaping between the ends of the bones was not noted. As there was considerable hemorrhage, the placenta was ex-

pressed almost immediately after the delivery of the child. This, however, did not completely check the bleeding, and on examination a deep tear was found in the left and anterior portion of the vagina, extending from the vaginal outlet almost to the cervix. A finger introduced into the tear came in contact with the cut ends of the bone, which were about 2 cm. apart. This wound, as well as a second degree perineal tear, was closed with interrupted catgut sutures. As there was still considerable hemorrhage, an iodoform pack was introduced into the vagina and a small drain brought out through the labial incision. The patient presented marked signs of collapse during and just after the operation, but revived after the injection of saline solution.

The child gasped a number of times, but could not be resuscitated. It was 57 cm. long, weighed 4050 grams, and presented the following head measurements: 13.25, 12.75, 10.5, 10.25, and 9 cm. No definite cause for its death could be ascertained. Dr. Goldsborough did not consider it due to the operation, as the extraction had been easy and only required two minutes, but was inclined to attribute it partly to the fact that the patient took the anesthesia very badly and partly because the resuscitation was intrusted to a student, as the serious condition of the patient claimed the services of all the assistants.

The puerperium was distinctly abnormal, and the patient was seriously ill for several days, the temperature reaching 102.2° on the seventh day and the pulse varying between 100 to 120. Catheterization was necessary for several days, and there was considerable edema of the left side of the vulva, but no definite hematoma formation. This did not interfere with a satisfactory recovery, as the patient was out of bed on the twentieth and was discharged on the twenty-eighth day, when the following conditions were noted: outlet excellent; cervix not torn; a linear scar on left side of vagina; uterus forward, movable, well involuted, appendages not felt.

There was a slight callus on the outer surface, but no trace of the bone wound on the inner surface of the pubis. Sacro-iliac joints normal; no motility on passive movement of thighs.

The patient was seen again six months later, when she reported that she was in excellent condition and had no trouble in walking or working.

Case VI.—Boston, Obst. No. 2539. Colored I-gravida, aged seventeen years. Generally contracted rachitic, assimilation pelvis with six sacral vertebræ. Measurements: 21, 23, 29, 16.5, and 9.5 cm. Pubic arch narrow. The child lay in L. O. A. Membranes ruptured twenty-four hours after the onset of labor, when examination showed that the cervix was fully dilated. Two hours later the head was still at the superior strait, with marked overlapping of the bones and a large caput, which reached to the ischial spines.

Operation, December 4, 1906. Preliminary manual dilatation of vaginal outlet. Left-sided Döderlein pubiotomy. High forceps were applied to the sides of the head, which was readily extracted. The bone incision gaped 4 cm. Slight hemorrhage, no vaginal or perineal tear. The child was born in good condition, weighed 3230 grams, and presented the following measurements: 14.5, 11.5, 9.5, 9.5, and 8.5 cm. The left parietal bone was markedly distorted and presented a deep depression where it had pressed upon the promontory of the sacrum.

The puerperium was febrile, though the patient was at no time seriously sick. The highest temperature was 101.5°, except for a single rise to 102.3° on the seventh day. There was some edema of the vulva on the third day. No trouble with the bladder; catheterization not necessary. The patient was out of bed on the seventeenth day and was discharged on the twenty-eighth day, when the following conditions were noted: outlet excellent; cervix, slight bilateral tear; uterus forward, movable, and well involuted, appendages not felt. Slight callus on anterior surface of pubic

bone, but no trace of section posteriorly. Sacro-iliac joints normal. Locomotion normal.

The patient reported in April, 1908, that she has been perfectly well since the operation.

Case VII.—Waters, Obst. No. 2851. Colored I-gravida, sixteen years old. Generally contracted, rachitic, assimilation pelvis, with six sacral vertebræ. Measurements: 23.5, 23.5, 26.5, 14.25, and 8.75 cm. Pubic arch wide, transverse of outlet 10.5 cm.

The child lay in L. S. A., and on account of the small size of the pelvis it had been determined to perform Cesarean section at the onset of labor. This was not done, as the membranes ruptured prematurely and within fifteen minutes after the first pain one foot, and a little later both feet, appeared at the vulva. When I saw the patient two hours later, the cervical canal was obliterated and the external os two-thirds dilated, with the breech still at the superior strait. In view of the prolapse of the feet, Cesarean section seemed contraindicated and pubiotomy appeared to offer the most conservative method of delivery.

Operation, February 3, 1907. After dilating the vulva manually and completing the dilatation of the cervix, pubiotomy was done on the left side by Döderlein's method, and the child readily extracted, during which the cut ends of the bone gaped for 6 cm. There was but slight hemorrhage and no vaginal or perineal tear. The child was born in excellent condition, weighed 3040 grams, and presented the following head measurements: 13, 11, 9.6, 8.75, and 7.5 cm.

The patient was very comfortable during the puerperium, in spite of the fact that a small hematoma developed in the left labium majus and catheterization was necessary for ten days. The highest temperature was 102°, on the fourth day. The patient was out of bed on the sixteenth day, and developed a slight phlebitis in the left leg four days later, which was not accompanied by a rise in temperature and did not materially

prolong her stay in the hospital, as she was discharged on the thirty-seventh day in excellent condition. At that time the following conditions were noted: Outlet excellent; cervix slight bilateral tear; uterus forward, movable, and well involuted; appendages normal. No callus on either surface of pubic bone; sacro-iliac joints normal. Definite motility on passive movement of thighs. Seen May, 1908, three months pregnant.

Case VIII.—Strange, Obst. No. 2964. Colored I-gravida, aged eighteen years. Generally contracted rachitic assimilation pelvis. Measurements: 21.75, 23, 27.75, 16.5, and 9.5 cm. Pubic arch good and transverse of outlet 10 cm.

Child in R. O. P. The first-stage pains were not severe. Membranes ruptured spontaneously at the end of forty hours, when the cervix was found to be fully dilated and the head resting at the superior strait. As there was no advance after three hours of strong second-stage pains, pubiotomy was determined upon.

Operation, April 15, 1907, by Dr. Goldsborough. Typical left-sided Döderlein pubiotomy, easy high forceps delivery, during which the wound bone gaped 5 to 6 cm. There was very little hemorrhage, no injury to the vagina, and only a superficial perineal tear, which required two sutures for its repair. The child was born somewhat asphyxiated, but was readily resuscitated. It weighed 2450 grams, and presented the following measurements: 13.75, 10.25, 9.5, 8.75, and 7.25 cm.

The puerperium was uneventful, the highest temperature being 100.2°. The patient was very comfortable and did not require catheterization. She was out of bed on the eighteenth day, walked on the twenty-third day, and was discharged on the thirty-fifth day. Examination at that time showed: Outlet excellent; cervix, slight left-sided tear; uterus forward, movable, well involuted; appendages not felt. Slight callus on anterior, but none on posterior surface of pubis. Sacro-

iliac joints normal; locomotion excellent; no motility on passive movement of thighs. Patient not seen since.

Case IX.—Bowie, Obst. No. 3149. Colored I-para, aged thirty-two years; spontaneous delivery of small child five years previously. Flat, rachitic pelvis; measurements: 25, 26, 30.75, 16, and 10.5 cm. Pubic arch fair, transverse of outlet 9 cm. Large child in R. O. T.

The patient was admitted after having been in labor for twenty-four hours with the membranes ruptured and the external os 3 cm. in diameter, with thick margins. Twenty-four hours later the patient showed signs of exhaustion, with a temperature of 100.2°. Examination showed that the cervix was 5 cm. in diameter and the uterus tightly contracted over the child. The head was movable at the superior strait, the posterior parietal bone presenting, and the ear lying just in front of the promontory. In view of these conditions, prompt delivery seemed imperative.

Operation, September 10, 1907, Dr. Storrs. After stretching the vaginal outlet and completing the dilatation of the cervix by Harris' method, a left-sided Döderlein pubiotomy was done. The child was delivered after an easy high-forceps operation, during which the ends of the bone gaped for 3 cm. There was no vaginal or perineal tear. The child gasped several times, but could not be resuscitated. Unfortunately, its weight was not noted. The head was markedly moulded, but showed no definite depression, death being probably due to the prolonged dry labor.

The puerperium was uneventful, except for marked mental disturbance, the highest temperature being 101.2° on the ninth day. In the absence of the nurse, the patient got out of bed on the fourth day, and after that turned freely in bed. She was allowed to walk on the twenty-second day and was discharged on the twenty-fifth day. At that time the condition of the soft parts was excellent, locomotion satisfactory and painless; no callus on either surface of the bone wound;

sacro-iliac joints normal; no motility on passive movements of thighs.

Case X.—Walters, Obst. No. 3070. Colored I-gravida, aged seventeen years. Generally contracted, rachitic coxalgic pelvis. Considerable scoliosis, with convexity directed to the right; numerous cicatrices over right buttock. Measurements: 19, 19.5, 25.5, 16.5, and 9.75 cm. Pubic arch and transverse outlet of normal. The child lay in L. O. T. The entire labor lasted sixty-one hours, fifty-two of which belonged to the first stage. Owing to the fact that several serious cases were going on simultaneously, both in the in- and out-patient services, which kept the entire staff busy, the patient was not seen until she had been in the second stage for nearly six hours; the pains, however, were not severe. At that time examination by the resident obstetrician showed the cervix fully dilated, the head at the superior strait, with the posterior parietal bone presenting. It was not possible to operate upon her for another four hours, but at that time she was in good condition and the child's heart apparently normal.

Operation, October 14, 1907. Typical left-sided Döderlein pubiotomy, easy high forceps, though rotation did not occur until the perineum was well distended. No vaginal or perineal tear; no hemorrhage. No note was made as to extent of separation of the ends of the pubic bones In spite of the easy delivery, the child was born dead and could not be resuscitated. It weighed 2410 grams and presented the following measurements: 15, 13, 9, 8.5, and 7.5 cm. No cause for death discoverable.

The puerperium was uneventful, the highest temperature being 100.4°, except for one occasion on the fifth day, when it reached 101.6°, which was attributed to a stitch abscess in the upper wound. Catheterization was not necessary. The patient moved freely in bed at the end of the first week; out of bed on the twenty-third day, and was discharged on the twenty-ninth day. Examination at that time showed the

perineum excellent; cervix not torn; uterus forward, movable, and well involuted and appendages normal. No callus on either surface of pubic bone; sacro-iliac joints normal. Locomotion excellent; no motility on passive movement of thighs.

The patient was demonstrated three months after the operation, when she walked and ran most satisfactorily.

CASE XI.—Slatoff, Obst. No. 3175. White I-gravida, aged nineteen years. Funnel-shaped pelvis, with following measurements: 26.5, 27.2, 31, 19, diagonal conjugate could not be measured. Pubic arch narrow, transverse of outlet 7 cm., anterior sagittal 6 cm., posterior sagittal 7 cm. Child lay in L. O. A.

The entire labor lasted twenty-two and a half hours. Examination at the end of twenty hours showed the cervix fully dilated, membranes ruptured, head well below the ischial spines. As there was no advance two and a half hours later, pubiotomy was determined upon.

Operation, October 25, 1907. Typical left-sided Döderlein pubiotomy. Forceps readily applied, but strong traction was necessary in order to bring the child to the vulva. After the outlet was well distended, the forceps were removed and the head expressed by Ritgen's maneuver. There was no tear of the vagina or perineum, and no hemorrhage from the pubiotomy wound. The child was born alive in good condition, weighed 3275 grams, and presented the following head measurements: 13.25, 11, 9, 9.25, and 6.75 cm. There was a deep mark over the forehead from pressure exerted by the tip of the sacrum.

A lead tape outline of the suboccipitofrontal diameter, when applied over a diagram corresponding to the measurements of the pelvic outlet, showed that spontaneous delivery would have been impossible.

The puerperium was uneventful, the highest temperature being 100.4°. The patient was catheterized but once,

turned spontaneously in bed on the third day, was up on the twentieth day, and discharged six days later. At that time the following note was made: Outlet excellent; cervix not torn; uterus retroflexed and movable; appendages not felt. Some induration in left labium majus; slight callus on anterior but none on posterior surface of pubic bone. Sacro-iliac joints normal; locomotion excellent; definite motility at bone wound.

The patient was seen three months later, when she stated that the results of the operation had been perfectly satisfactory, and that she was able to attend to all of her duties without discomfort.

Case XII.—Frazier, Obst. No. 3211. Colored I-gravida, aged seventeen years. Generally contracted pelvis: 21, 23.5, 26.5, 17.5, and 10 cm. Pubic arch narrow, transverse of outlet 8 cm.

The patient was in the ward nearly one month before labor; pains commenced at 7.30 p.m. November 23, 1907. Vaginal examination at 2.50 p.m. the next day showed that the cervix was 5 to 6 cm. in diameter, the child in R. O. T., with the posterior parietal presenting. When I saw her at 7 p.m., after three hours of strong second-stage pains, the cervix was completely dilated, the head movable at the superior strait, with the sagittal suture just behind the symphysis and the right ear over the promontory of the sacrum. There was a marked caput. In view of the persistent posterior parietal presentation pubiotomy was determined upon.

Operation, November 24, 1907. After preliminary dilatation of the vaginal outlet, the saw was applied by Döderlein's method and the left pubic bone severed without great difficulty. Forceps were applied to the sides of the head, which did not descend, in spite of vigorous traction, the ends of the bone gaping only 2.5 cm. On introducing a finger through the upper incision, it was found that the bone was held together by some of the fibers of the anterior pubic ligament,

but upon severing them separation occurred to the extent of 5 cm., and the head was readily brought to the outlet and finally delivered by Ritgen's maneuver. There was slight hemorrhage during the operation.

The child was deeply asphyxiated when born, but was resuscitated without great difficulty. It weighed 3250 grams and presented the following measurements: 14, 12.5, 9.5, 9.25, and 8.5 cm.

The perineum or vagina was not torn, but upon inspecting the external genitalia it was found that a deep tear had occurred on the left side of the vestibule which extended from the anterior margin of the vaginal opening to above the clitoris, whose left crus had been torn through. The urethra was not involved. A finger introduced into the tear could be brought out through the upper pubiotomy incision and came in contact with the cut ends of the pubic bone. The laceration was closed by interrupted catgut sutures, except at its apex, through which a small iodoform drain was passed.

The puerperium was uneventful, the highest temperature reaching 102° on the sixth day. The patient had difficulty in voiding, and required catheterization for a number of days. There was some swelling about the left labium majus and a fistulous tract persisted for some days at the upper end of the vestibular wound, which, however, closed spontaneously. The patient sat up on the twentieth day, and was discharged on the twenty-sixth day.

At that time the pubiotomy wound was found healed by first intention, there was no induration or swelling of the vulva, the outlet was excellent, the cervix had a slight stellate tear, uterus retroflexed, movable, and well involuted, appendages not felt. No trace of the bone wound could be felt on either surface of the pubis. There was apparently no motility on passive movement of thighs. Locomotion was excellent, and the patient presented no subjective symptoms.

Case XIII.—Turner, Obst. No. 3337. White II-gravida, aged twenty-five years, entered hospital in labor March 11, 1908. Generally contracted funnel pelvis: 20.5, 26, 29, 18, and 11 cm. Pubic arch narrow, transverse of outlet 7 cm.; anterior sagittal, 5 cm.; posterior sagittal, 6.5 cm.; and anteroposterior diameter, 9.5 cm. Former labor very difficult on account of the outlet contraction; child died from fractured skull after a most difficult low-forceps operation.

Labor began 5 p.m., March 11; cervix completely dilated and membranes ruptured at 6.15 a.m. March 12. At that time the child lay in L. O. T., with head movable at superior strait. As engagement had not occurred two hours later, in spite of strong pains, it was determined to perform pubiotomy, in view of the past history.

Operation, March 12, 1908. Preliminary manual dilatation of vaginal outlet. Döderlein subcutaneous pubiotomy on left side. The head was readily brought to the vulva and delivered without the use of traction rods, the ends of the pubic bone gaping 4.5 to 5 cm. There was very little hemorrhage. The perineum or vagina was not torn, although there was a slight tear in the vestibule to the left of the urethral opening, which was repaired by two catgut sutures. The child was born in good condition, weighed 3820 grams, and presented the following measurements: 14.5, 11.5, 9.75, 9, and 8 cm. A lead tape moulding of the suboccipitofrontal circumference of the head applied over a diagram of the pelvic outlet clearly showed that spontaneous labor could not have been expected.

The puerperium was uneventful, the highest temperature being 995°. The patient was catheterized for the first two days, but suffered very little discomfort. On the fifth day she turned freely in bed, sat up on the fifteenth day, and was out of bed on the eighteenth day. At discharge, on the twenty-fifth day, the pubiotomy wound was found to be well healed; no callus on the posterior surface of pubic wound and very little on anterior. No motility on passive move-

ments of thighs; locomotion normal and without pain. Six weeks later her condition was most satisfactory in every respect, and she was able to do everything which she had done before the operation.

CONCLUSIONS.

1. In thirteen pubiotomies performed at the Johns Hopkins Hospital there were no maternal and three fetal deaths, only one of which was attributable to the operation.

2. All patients were delivered immediately after the operation by forceps or version. There were no injuries to the bladder, three perineal, and only one deep communicating vaginal tear, notwithstanding the fact that nine of the patients were primiparæ.

3. The relative infrequency of injury to the soft parts is attributed to the employment of Döderlein's technique, but particularly to extensive, preliminary, manual dilatation of the vagina and perineum.

4. The after-treatment is not so onerous as is generally stated, and is greatly facilitated by the use of the Bradford frame. Immobilization of the pelvis is not necessary. The patients usually move spontaneously in bed on the third or fourth day, get up on the twentieth day, and are discharged on the thirtieth day, with satisfactory locomotion. Healing generally occurs by the formation of fibrous tissue, and in at least one-fourth of the cases there is definite motility between the ends of the bone.

5. The maternal mortality should be less than 2 per cent., provided the operation is performed by competent operators upon uninfected women, who have not been exhausted by previous attempts at delivery.

6. It is indicated in contracted pelves in which the conjugata vera does not fall below 7 cm., and after a test of several hours in the second stage of labor has shown that the dispro-

portion between the head and the pelvis cannot be overcome, as well as certain cases of outlet contraction.

7. In multiparæ with a history of repeated difficult labors, or in primiparæ presenting excessive disproportion, it is inferior to Cesarean section performed at the end of pregnancy or at the onset of labor. In other cases it does not enter into competition with it, as it is the operation of choice in borderline pelves after the patient has been subjected to the test of labor, and at that time is five or six times less dangerous than Cesarean section.

8. It should replace high forceps, prophylactic version, induction of labor, and craniotomy upon the living child in uninfected women.

9. It should not be employed in infected patients or after failure to deliver by other means. It should be regarded as a primary operation, whose dangers are infection, deep tears, and hemorrhage.

DISCUSSION.

Dr. Egbert H. Grandin.—I do not know that I have any more to add to that which I have already written, but did not read yesterday owing to the time limit. I then stated, basing my judgment on American statistics—since I could best judge of the work from that standpoint—that I would reject pubiotomy or hebosteotomy, my statement being based on mere morbidity and not mortality rate. After listening to this paper—and first telling you that in my previous statement I had in mind the cases which appeared in Dr. Fry's paper—I am willing to modify that statement to the following effect: I except Dr. Williams from that statement, and I only hope he will be as fortunate in his future researches. I stated in writing, but did not have time to read it, that I could not conceive of hebosteotomy or pubiotomy being made an *elective* operation any more than in the past I was willing to admit that symphyseotomy could become an elective operation. I still contend

that, in the border-line cases, other things being equal, hebosteotomy requires an expert as does Cesarean section, and I believe that symphyseotomy, as performed in America, shows a less morbidity rate and a less mortality rate on the side of the woman, with as many, if not more, living children than hebosteotomy does. I am not willing to admit from my standpoint—and after all the personal equation enters into the evolution of statistics—that in the lesser grades of pelvic contraction the induction of labor is a lost art. Much depends upon how one induces labor. If you induce labor by the use of bougies, by the use of the Karl Braun colpeurynter, who taught me how to use it, and apply high forceps when the head is movable above the pelvic brim, I grant you the induction of labor is a lost art; but if the indication is present and you induce labor after the manner I have been trying and attempting to drill into the minds of the profession for twenty-two years, namely, to pack gauze in the vaginal portion of the cervix in order to cause it to merge into the lower uterine segment, followed by the use of the best instrument we have, the *human hand*—unless it be unusually large—that thus I can show more living children, with less morbidity, and no maternal mortality—Dr. Williams, in America, alone excepted—than the advocates of hebosteotomy can show.

Professor J. Pfannenstiel.—The paper of Dr. Williams has interested me very much, and I can confirm his conclusions. I have done hebosteotomy in 27 cases, without either a maternal or fetal death, and the indications as given by Dr. Williams are correct, about 7 cm. But it all depends upon the relation between the child and the pelvis. I agree with him also that this operation should not be done in infected cases. I did it once in an infected case; the woman had fever following the operation, and was very ill for some time. She recovered, however, and since then I have decided not to do the operation in cases that are infected.

Concerning the indication for the induction of premature labor, I agree with what has been said, and I wish to say in this connection that pubiotomy is not an operation for the general practitioner to do. The same holds true with regard to the induction of premature labor, and I do not think the results are as bad as have been stated in different papers.

Of more than 150 cases, I have had no maternal mortality from the induction of premature labor in my practice; but in the last 50 cases there has been mortality to the children. If we reckon all children who leave the hospital after some weeks and death follows, then I have lost about 18 per cent. of children. In view of these facts, while we can content ourselves with this method, still we must have a special indication for it.

Dr. Edward P. Davis.—It is interesting to note that Bumm, in his series of 52 cases, does not state the fetal mortality, as I read the paper. He makes the simple statement that he has done 52 operations, with no maternal mortality, but does not give the fetal mortality.

As regards the statement made by Dr. Williams, that 70 per cent. of labors in moderately contracted pelves will terminate spontaneously, I will say that in my experience in a series of 1200 cases of pelves of all sorts the contracted pelves included, fully 80 per cent. terminated in spontaneous labor, and, therefore, a larger number of these border-line cases should have the test of labor.

As regards the mortality of the early Cesarean section, I think we are quite agreed as to that. The mortality of Cesarean section after labor is doubtful, and I think Dr. Williams' estimate of that is much too high. My own experience, including cases which have had labor induced with the hope of avoiding Cesarean section, has been a maternal mortality of 2.3 per cent., and fetal mortality nil; 42 cases all came into labor, and had no forceps or version tried. Some had induced labor, but they had a fair test of labor for a number of hours. One woman who died did not have labor induced, but a spontaneous labor.

According to two years of the recent literature, there were 77 cases of pubiotomy reported by various authors upon the subject, giving a maternal mortality of 6 per cent. These figures were taken from the medical journals I have in my library, French and German, with a fetal mortality of from 11 to 13 per cent. Then comes Bumm's collection of cases, which is the largest collection by any single operator, with no maternal mortality, and no statement of the fetal mortality. As regards Dr. Williams' argument, I agree with him that the mortality of the early Cesarean section is less,

and possibly the operation is very desirable in most cases. However, I think Dr. Williams has overestimated the mortality of Cesarean section after the test of labor, but without an attempt at delivery by version or by forceps. Furthermore, I would most heartily join with Dr. Williams in saying that obstetric operations are major operations; that they are to be undertaken under the same aseptic conditions as other major operations, and it is time that the general profession had that matter seriously impressed on their minds, that when difficulty occurs in labor, it is not the duty of the practitioner to interfere, to attempt forceps or version, unless he is sure of his ground. In teaching medical students, the importance of diagnosis is pointed out and the difficulties of labor recounted. They are taught version and the application of forceps, but special stress is laid on the fact that unless certain clear indications are present, they must not interfere; they must have consultation. Throughout the Continent of Europe there are a great number of men competent to perform these operations, and in the development of American medicine the young graduate of medicine will have hard work to find a place where there is not within his access a hospital within a reasonable distance, or a surgeon who is capable of going to the house and performing a major obstetric operation. These major obstetric operations, when done by competent men, with good assistants in private houses, are usually successful; but young graduates should be warned against interference with version and forceps in difficult cases.

At this meeting I am glad to hear the opinion expressed that when the head is movable above the pelvic brim, forceps should not be employed. This is a position which I took some years ago, but at that time the opinion was not shared by the majority of those who teach obstetrics.

The gist of this paper, which is a most timely one, concerns the election of obstetric operations, hysterectomy, and other important procedures, and when obstetric operations are elective we have a fair basis for comparison.

Dr. Robert A. Murray.—I have not had any experience with pubiotomy, but judging from the statistics, after having done symphyseotomy and elective Cesarean section, I think that if I had the opportunity I would not hesitate

to resort to pubiotomy, but not in the cases that have come to me in consultation, because I have never felt that I should subject those patients to that risk. I feel more sure of Cesarean section after labor has commenced. I must say, where practitioners have been taught asepsis and have practised it, and not to use forceps and try version where useless, I have had just as good results in my Cesarean sections as in the elective ones, when I have waited to allow the patients to have the test of labor. So I have not had any experience with pubiotomy, but with Cesarean section, and do not think I will change the latter unless we have better statistics than those given by others than Dr. Williams and Professor Pfannenstiel, who carefully select their cases with regard to the size of the pelves.

Dr. Barton Cooke Hirst.—I had not the pleasure of hearing Dr. Williams' paper, but I understand from the synopsis in the official program it was in favor of pubiotomy and condemnatory of the induction of labor. After a trial of both symphyseotomy and pubiotomy, I feel that pubiotomy will not retain a permanent place among obstetric operative procedures any more than symphyseotomy has. Nobody I know of, with possibly one or two exceptions, does symphyseotomy any more, and five years hence very few surgeons will be doing pubiotomy. When we condemn a procedure approved by many competent men, we should, I think base our opinion upon personal experience. I have long known Dr. Williams' views on the subject of induced labor for contracted pelvis, and I have also known that his objection is purely theoretical; that he has not given it a personal trial; whereas those of us who have extensive experience cannot help but think it a most useful procedure, not to be condemned, but, on the contrary, employed more frequently than it is. Two years ago I published statistics of more than two hundred induced labors for all causes from one clinic alone. Without any special prejudice against one operation or in favor of another, my personal experience has taught me that the induction of labor is an exceedingly useful, valuable, and safe procedure, and with the good hygienic conditions that obtain in our best hospitals and private houses, with the good trained nursing we can command, I do not find an increased infant mortality three or

four weeks before term, as contrasted with the mortality of infants born at term.

In regard to the major operations, in cases that cannot be delivered by forceps or version, and must be delivered by pubiotomy or Cesarean section, my experience is that the latter operation is safer than pubiotomy, and I think the statistics of all operators, fairly presented, support this view. Granted that the two operations are equally safe or nearly so, I cannot understand why any one should deliberately elect pubiotomy, with the necessity for numerous assistants, the likelihood of an awkward hemorrhage, the possibility of injury to the bladder, the atrocious inconveniences of the convalescence, and the dubious outlook for union of the pubic bone, not to mention the necessity for a purely obstetrical operation to extract the child after the pubic bone is cut and the uncertain prospect for the infant.

Dr. Henry D. Fry.—We all may get reports of 15 cases of pubiotomy that have been done without a maternal death, or we may have 27 cases without a maternal death, but that does not tell half the story. It is the morbidity. I started this operation with a great deal of enthusiasm. It is one of the most gratifying operations to do in obstetric surgery. So far as the operation itself goes it is ideal. It is very easy to saw the pubic bone. The bone saws through so easily that it is almost like cutting through butter. That far you are delighted with the operation; but there are certain accidents which may happen during the operation. In the first place, tearing the anterovaginal wall is likely to occur during the extraction of the child, owing to the fact that the bones are not supported properly, and the stretching of the tissues tears the anterior vaginal wall; it tears the plexus of veins, and you get hemorrhage.

Another complication which has occurred in some cases should be referred to. Dr. Williams states that with his thirteen operations, all elective, he had a morbidity of over 50 per cent. The trouble is you will get that morbidity, and as long as I get a convalescence that is so painful as these cases have, as contrasted with the convalescence of the elective Cesarean section, I will never select pubiotomy in preference to Cesarean section, provided the woman has any chance, and I would give her that chance if she has been

in labor twenty-four or thirty-six hours. I would rather do it, provided you have not had forceps used or any efforts at version made. I would rather do Cesarean section. I believe the mortality will be no higher than that of pubiotomy, and convalescence will be much better.

Another complication that has followed these cases so much is septic phlebitis. So many patients have had that. In the cases which I collected a year ago, 12 of them were primary, 8 secondary, with 4 deaths in the secondary cases. Dr. Williams kindly sent over to me the records of his cases that he had operated on up to that time, seven in number, and they were all primary. In reading over those records every one of those women I would consider good cases for elective Cesarean section. I remember one case where Dr. Williams discarded Cesarean section and did pubiotomy simply because the baby's leg came down into the vagina, and I think in every one of those cases the women would have gotten well with Cesarean section and there would have been no morbidity. Now as I look over those cases of Dr. Williams, seven in number, there is one case which he has referred to of extensive laceration which extended from the anterior vaginal wall through into the incision, exposing both ends of the pubic bone, and attended with severe hemorrhage. Dr. Williams states that he has had one case of septic phlebitis. Fully 25 per cent. of the cases had septic phlebitis. There is one other case I took notes from, which Dr. Williams has not mentioned as regards the final result a year afterward. "The woman complained of some difficulty in going up and down stairs, having to put her entire weight on the right foot." In the case I had there was good union, and I believe generally we will get union, but some of these patients have difficulty in walking. In one case I had, while there was no injury to the bladder, from the stretching she had incontinence of urine for two or three weeks, but finally she could urinate without any pain or difficulty.

Now, as I said yesterday, I believe high forceps, where the head is above the pelvic brim, is an obsolete practice. I believe that version in contracted pelvis will soon become obsolete. A great many object to that, and still practise high forceps and version. But I believe we have something

better now, and that is, if you cannot do Cesarean section, then do pubiotomy, and I believe there is a limited field for it as a secondary operation. That where you have a case in which the hand has been introduced into the uterus, dilatation has been effected, and forceps tried, and you do not want to do Cesarean section, then comes in the question between craniotomy and pubiotomy. You do not want to do craniotomy if you think the child is in good condition or will live, and I would give the child a chance by resorting to pubiotomy. But I see a limit to secondary operations of that kind; it is simply my belief that where you cannot do Cesarean section, rather than do version I would resort to pubiotomy. Take the border-line cases, where you do not know whether to do Cesarean section or not, and you are a little afraid to do it, and probably forceps has been used, I would do pubiotomy. This woman whose case I have mentioned suffered the tortures of the damned for a week or two. If you have got to introduce a catheter, it is difficult. You have edema of the labium, generally of the left one. The only thing to do is to introduce a catheter and keep it there. Until I can get a better and less painful convalescence, I am not prepared to accept pubiotomy as a primary operation.

Dr. Richard C. Norris.—I have been much interested in Dr. Williams' paper, and while not perhaps so enthusiastic as he is, I am disposed to take a more favorable view of the operation than most of the gentlemen who have spoken. I have watched its development with a great deal of interest, and when my paper is published and read, you will find I have discussed it much along the lines that Dr. Williams has.

In the first place, I would like to say, in reference to Dr. Williams' paper, that I am not and have never been, a firm believer in statistical arguments. I believe that reduction to algebraic expression or arithmetical problem cannot prove propositions in surgery. I would differ with him in his attitude with regard to induced labor, and will try to show how the final calculation is influenced by a single figure. He starts with a fetal mortality for induced labor of 30 per cent., whereas in 30 cases of my own, reported in my paper, the primary mortality was 10 per cent., and of

that 10 per cent. there were at least 4 cases that in the light of their experience would not be subjected to induced labor, but to pubiotomy. In his statistical calculations, 30 replaced by 10 will show the results wholly different. My experience with two cases of pubiotomy and my studies of the operation, as performed by the various operators of the world, have made me more or less familiar with it. In addition to what Dr. Williams has said as to the subcutaneous method, the introduction of two fingers behind the pubic bone in the region of the tubercle of the pubis is of special advantage. I find it of great advantage to have two fingers placed in the vagina, which serve not only to push the bladder attachments upward and away and push the baby's head away, but in addition the assistant has a catheter in the bladder drawing it to the opposite side, which avoids injury by the needle during its passage under the pubic arch, and by holding the labium firmly beyond the median line the danger of hematoma is reduced to a minimum. This is valuable in the technique to avoid perforation and cutting of the vulvar veins by the needle and saw. There were only two or three drops of blood from the lower incision in my two cases. As to the danger of other injuries to the birth canal, Dr. Williams, as I did yesterday, laid great stress upon the matter of preliminary dilatation. I would differ with him in regard to manual methods of dilatation, preferring the Pomeroy bag method. It is an integral and essential part of the operation of pubiotomy in primiparous women. Next to that comes the necessity for careful obstetrics. Men vary in their skill in the use of forceps, and if, when the pubis is opened, forceps is applied and the head dragged forcibly through the birth canal, without preliminary dilatation, what else can happen but extensive laceration? Preliminary dilatation should be resorted to, and there must be extreme caution in the use of extraction, avoidance of undue force; then there will be no laceration of the veins. The bleeding from the cut surfaces of the bone is readily controlled by a gauze plug put in the opening. There should be careful obstetrics after the pubis has been severed. If you read carefully the histories of cases, you will find that many of the cases of extensive laceration have occurred in posterior occiput positions. These are difficult forceps deliveries. I

have found great advantage in manual rotation of the occiput, when above the pelvic inlet, to an anterior position before applying forceps, so that if I ever did pubiotomy in a case of occipitoposterior position, I would rotate the occiput anteriorly before applying forceps. The section and further separation of the bone during the traction shorten the depth of the vagina, prevent anterior rotation of the occiput, decrease the space, and add to the danger of laceration in this class of cases.

As to the mortality, Dr. Williams has laid stress on the fact, which I wish to emphasize, that if we are to compare the results of pubiotomy with those of Cesarean section, we must compare them under like conditions of duration of labor, degree of infection, etc. In other words, it must be an elective operation to accomplish the best results.

As a further consideration, I differ most emphatically with Dr. Williams as to the question of induced labor. The object of our discussions at this meeting, as it should be at all times, is to help determine, if we can, the class of cases to which we shall apply induced labor, the class of cases for which we shall teach forceps, the class of cases for which we shall use version, and the class of cases we shall reserve for Cesarean section. It is necessary to study these operations from that point of view, and if induced labor is placed in its proper place, and applied only to that group of cases, then spontaneous deliveries, which are the most desirable results of all, will be largely on the increase. These are my chief points; then if you gentlemen with wide experience can teach the average practitioner, and advise him when *not* to use forceps, when *not* to use version, and when *not* to do pubiotomy or Cesarean section, and when to induce labor, you have accomplished the object of our discussion today. When we come to the final decision of this matter, the man who is best qualified to relieve the distress of such a patient by opening the abdomen will do far better by Cesarean section than the man whose experience as a pubiotomist has been limited. The man who has had considerable experience as a pubiotomist may do for his patient much better by performing that operation. So, after all, it is a matter of choice and training, and we, who are presumed to be the leaders of obstetric thought and obstetric action, owe it to ourselves to try

thoroughly a new method that promises success, so that we may determine for the general practitioner which is best for us and which is safest for him. In conclusion, let me say that while I am not enthusiastic beyond a reasonable degree over pubiotomy, I believe it should receive a more extended trial.

Dr. Williams (closing).—I am very much obliged to the members for the full discussion they have given this subject, and I shall try to answer the speakers individually and as briefly as possible.

In regard to what Dr. Grandin said, I do not believe, if his method of induction of labor were generally adopted in a series of cases, where he dilates the cervix manually, the results would be satisfactory. You cannot dilate a hundred cervices one after another without getting serious injury, and once in a hundred cases you will get a tear through the lower uterine segment which will tax your ingenuity to overcome, let alone the chance of infection of the woman.

I was very much interested in Dr. Pfannenstiel's remarks, but I must take issue with him on one point. I am not very friendly toward the induction of premature labor, and, as a representative body, I do not believe it is our business to take care of the general practitioner. We do not want to lay down methods of treatment for him, but should teach him that a large part of obstetrics, just as a large part of surgery, he has got no business to do, and if he has a single case of contracted pelvis with which he is unable to cope properly, he has no right to continue to treat that woman according to inadequate methods. Not long ago I met a doctor in Baltimore who said to me, "I am going to see an interesting case." I said to him, "What is it, Doctor?" He replied, "I am going to do my sixth successful craniotomy on a woman;" and he added, "What do you think of that?" I replied, "I think you are a murderer and ought to be in the penitentiary; you are not half as good as the ordinary abortionist; he does it at an early period, when the danger is not so great. Here you kill the sixth child." It is needless for me to say, that man has not spoken to me since. The point is, we cannot teach men like that that they are not justified in treating this class of cases. I do not believe in laying down rules for the general practitioner, except to say there

are certain cases which he ought to put into the hands of men who are able to take care of them. The whole question of induction of premature labor can be summed up in this way: If we treat these border-line cases expectantly, we will get in the neighborhood of 80 per cent. of spontaneous deliveries, and there will remain the other 20 per cent. In three-fourths of the remaining 20 per cent. the head will get down into the pelvis and delivery be effected in accordance with the ordinary indications, leaving about 5 per cent. of the cases which will actually need interference on account of absolute disproportion. If you are going to practise the induction of premature labor in these cases, you must operate on a large number of women unnecessarily, instead of operating on a small number as a matter of necessity. That, to my mind, is the crux of the whole situation. When practitioners tell us that they have induced labor two or three weeks before term, they have done it unnecessarily; they have made a mistake in the duration of pregnancy, or put it off three or four weeks before term, when the diminution in the size of the child is not sufficient to overcome the extreme degrees of disproportion.

Going back to the statistical method, Dr. Hirst says he has resorted to the induction of premature labor in 200 cases. If he has induced labor in that many cases, he has done a large number intentionally. If one-fifth of those women had a serious disproportion, as I figure it, that experience ought to come in four dozen contracted pelves, and contracted pelvis occurs once in 12 cases. You see what it means. He ought to have that experience in 30,000 or 40,000 cases.

As to the remarks of Dr. Davis, they were of great interest, but I must take issue with him in two things: (1) I do not agree with him as to the common-sense of Cesarean section after the test of labor, and by the test of labor I do not mean when a woman has been in labor for a few hours, but has gone into the second stage, and has good hard expulsive pains for two hours. That woman does not have a simple result. You do not get 1 and 2 per cent. mortality. The operation is not like the simple removal of an ovarian cyst or a supravaginal hysterectomy at an appointed time, but a serious operation; and my experience has been that while the gross mortality has been quite satisfactory in that class of

cases, the morbidity, after conservative Cesarean section, has not been satisfactory; and when I have subjected a woman to the test of labor and done Cesarean section, the only time I got an ideal convalescence was in the cases in which I removed the uterus. I take it under such circumstances we have the same factors that we have in myomectomy and in supravaginal hysterectomy. We know the latter cases have an ideal convalescence. We know, too, that the myomectomy cases have a much smoother convalescence, although the actual mortality is not much greater.

In regard to the remarks of Dr. Hirst, I think he conveyed a false impression by basing his remarks upon his combined experience with symphyseotomy and pubiotomy, in that the results are only analogous so far as the child is concerned. So far as the mother is concerned, there is no comparison between the results of the two operations. The after-care of the patient is not so serious as stated. We have used the Bradford frame with these women, which is simply a quadrilateral piece of gas piping with twelve or fifteen inches not covered by canvas. The nurse can raise it up with one hand and the genitalia made accessible. The woman turns on the frame in two or three days, and we allow these patients to sit up after the expiration of the second week. Their convalescence has been very good; they have not complained very much. My nurse tells me that she would rather deal with the after-care of a pubiotomy case than one of Cesarean section. The former is more trouble, but does not give anything like the same anxiety.

In reply to Dr. Fry, I would reiterate what I have previously said, which will answer his remarks in part. I am sure that if he reserves the operation as a secondary procedure, the results will be as bad as in the first paper he read on the subject. The only way to get good results is to do it early as a primary operation. I do not think I am prejudiced in this matter. I have had considerable experience with Cesarean section, and I feel, in any case where I am sure the disproportion cannot be readily overcome, that the idea of Cesarean section at the end of pregnancy or in the first few hours of labor should be entertained, as under such circumstances we get very little mortality and a convalescence which is ideal. But I believe that if we allow it to go until

the second stage of labor, and wait for the second stage pains to overcome the disproportion, Cesarean section is a dangerous operation. It has a mortality of over 5 per cent., and I think between 5 and 10 per cent. I believe that right here pubiotomy is the substitute, and if we resort to it we will save more women and just as many children under these circumstances. Of course, I am open to conviction with regard to the induction of premature labor, but unless things change markedly in the future, I do not expect to have any experience with it. I am willing to be convinced, but until I am convinced I am going to proceed along the line I have indicated to you.

THE HEART IN SHOCK.

By Eugene Boise, M.D.,
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The most generally accepted theory as to the pathology of shock is that of which Dr. G. W. Crile is the most recent and most prominent advocate, namely, that shock is an exhaustion of the vasomotor centre.

Dr. W. H. Howell has advanced another theory, or, perhaps more correctly, a modification of this theory, that in addition to the vasomotor exhaustion (which he terms vascular shock) there is a cardiac shock, characterized by an exhaustion of the cardio-inhibitory mechanism, and that, of the two, this is the more important, inasmuch as while cardiac shock may exist without vascular shock, vascular shock is always preceded or accompanied by cardiac shock.

Quite recently Dr. Yandell Henderson, of the Yale Medical School, has stated that experiments that he has made seem to demonstrate that certain forms of shock are caused directly by diminished amount of CO_6 in the blood, and that the low blood pressure and the severe tachycardia of shock can be produced or relieved at will by decreasing or increasing the amount of carbon dioxide in the blood; or, in other words, by regulating what he called the "pulmonary ventilation."

He says: "Exposure of the abdominal viscera to the air, so as to allow a free exhalation of CO_2 from the surface of these organs, induces, even when no further operation is performed an extensive congestion in the part exposed. . . . If a

general abdominal congestion has been thus induced, and is then followed by even a moderate hyperpnea through the stimulation of an afferent nerve, the subject passes within a few minutes into shock."

He also states that when death followed rapidly after the production of excessive tachycardia and low blood pressure, the heart was in a tetanic condition. The ventricles were small, empty, and hard. The low blood pressure was caused by decreased output from the heart. Also, that in cases more slowly produced the diastolic strokes became much reduced, and the heart, therefore, received but little blood and threw but little into the arteries.

He also says: "The condition of shock which results in man from extreme physical suffering is, to a large extent we believe, caused by the reduction of the CO_2 content of the blood and tissues below the normal tension, by the violent and prolonged hyperpnea induced by the stimulation of afferent nerves." Also, "Out of a very large number of experiments involving extensive and prolonged operations, the symptoms of shock, as above described, have never developed in a single case in which any considerable loss of CO_2 below the normal was prevented."

Ten years ago, in a paper read before the New York Obstetrical Society, I advanced the theory that the essential feature of shock is an excessive irritation or stimulation of the entire sympathetic system of nerves, the principal manifestation of which is low arterial pressure; that this low blood pressure is due principally, if not entirely, to cardiac conditions, namely, excessive systolic energy with deficient diastolic relaxation; that this results in greatly decreased output of blood from the heart because, by reason of the imperfect relaxation of the ventricles, but little blood can be received from the veins, and, therefore, but little can be sent into the arteries.

Other theories have been advanced by other investigators,

but nearly all discussion has centred around the circulatory conditions, the belief being almost universal that in its low blood pressure lies the danger in shock.

Crile's theory, that the essential feature of shock is exhaustion of the vasomotor centre, must, I think, be abandoned.

W. T. Porter, with H. K. Marks and J. B. Swift, Jr., in a paper on "The Relation of Afferent Impulses to Fatigue of the Vasomotor Centre," say: "In a number of experiments (19) when various afferent nerves were subjected to long stimulation by induction currents, there was no significant fall of blood pressure." "Nor have we been able," they say, "to find in the literature any instance in which the stimulation of a nerve produced such a fall in the normal animal."

They quote some of Crile's experiments as apparent refutation of this statement, but say: "It is impossible to draw correct conclusions from such experiments, because they confuse hydrostatic, chemical, and nervous phenomena." They also say: "Nor have we been able to find acceptable instances of vasomotor fatigue in animals not to be classed as normal." And they conclude the paper by saying: "Yet we have seen no instance in our own experiments, or in the literature, in which the blood pressure suffered more than the usual temporary fall in cases uncomplicated by inhibition of the heart, hydrostatic reduction, or anemia of the bulb."

Thus we have the testimony of Porter and others that long-continued stimulation of afferent nerves does not cause low blood pressure through exhaustion of the vasomotor centre.

Also, Crile's own experiments disprove his theory. He repeatedly and emphatically states that in all cases the integrity of the stellate ganglia was necessary to the production of shock. If these ganglia were first removed, irritation of afferent nerve trunks caused no change in blood pressure.

Now, we all know that it is through the stellate ganglia that accelerator impulses are carried to the heart. Stimulation of these ganglia causes acceleration of the heart's action

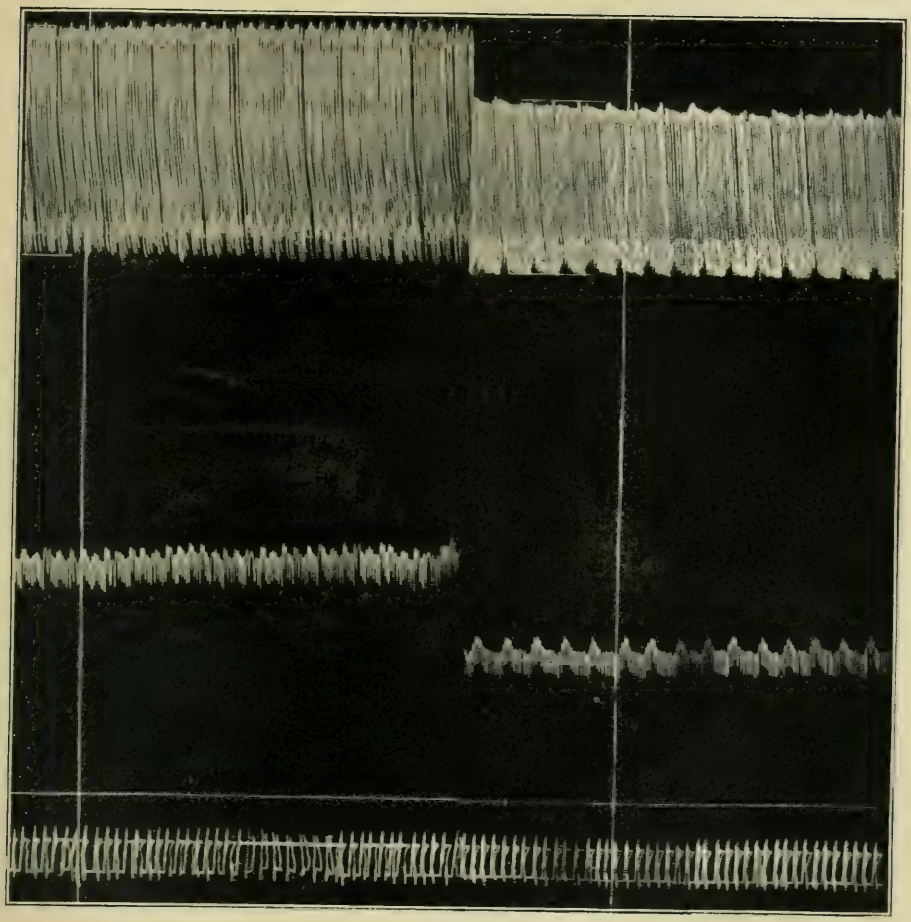


Fig. 1.—Showing the condition of the heart in shock. First half, normal dog. Second half, same dog in moderate shock. Systole increased and diastole greatly decreased. Tonic spasm. Pressure low.

Fig. 2.—Showing action of adrenalin on heart. First half, tonic contraction of veins, causing increased blood supply to and from the heart, with rapid rise of pressure. Second half, tonic contraction of heart. Increased systole and decreased diastole, the same as in shock (Fig. 1).

FIG. 3.—Showing toxic action of moderate dose (0.6 c.c.) of veratrone (intravenously) on normal dog.

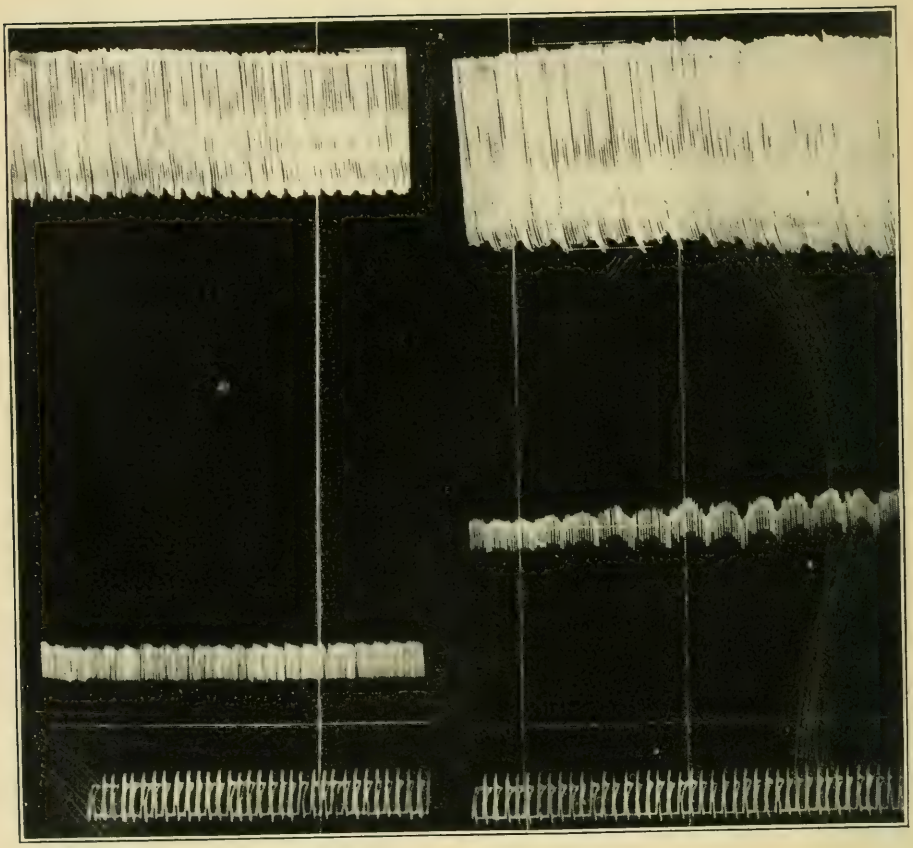


FIG. 4.—Showing action of large dose (4.7 c.c.) of veratrone (intravenously) on dog in profound shock. First half, low pressure and diminished amplitude of heart beat. Cardiac spasm. Second half, blood pressure restored to normal after use of veratrone. Amplitude increased. Cardiac spasm overcome. Normal output from heart. No toxic effect.

and increase in the energy of its contraction. It has no influence on the vasomotor centre.

Again, Crile states, in his summary of autopsies: "The large venous trunks were full, sometimes *enormously engorged.* The arteries were empty. The veins of the splanchnic area *were not* more distended than those of the somatic, unless the experiment had included some procedure in the splanchnic. The left ventricle and the left auricle were empty or nearly so; the right auricle usually contained some blood, the right ventricle little or none," etc.

Now let us briefly analyze these statements. The animal is supposed to have died from shock induced by vasomotor paralysis. Now, Romberg and Passler and others say that in vasomotor paralysis the blood is collected in the splanchnic vessels, and the somatic veins, venæ cavæ and all, are only partially filled. But Crile says: "The large venous trunks were full, sometimes enormously engorged," and "the veins of the splanchnic area *were not more distended than those of the somatic.*" Therefore, this could not have been like the vasomotor paralysis of Romberg. Again, "the arteries were empty." The heart was empty *except the right auricle,* and contracted in systole. This condition he attributes to low venous pressure. The heart was in a condition to receive blood, but could not do so because the venous pressure was too low. Yandell Henderson seems to adopt this view, but erroneously, I think.

Howell says: "The pressure of the peripheral veins normally is less than in the capillaries, and declines as the blood reaches the large veins. Very close to the chest the pressure is below the pressure of the atmosphere."

Wachenfeld (*Medical Record,* March 7, 1908) says: "It is undoubtedly true that the blood when it returns to the right auricle does so under very low pressure; we may safely say under the remainder of the pressure which has propelled it through the heart, arteries, capillaries, and veins. What-

ever the views on this subject are, it is accepted that the pressure within the great veins in their portion nearest to the heart is normal."

The pressure could not be lower, and yet the normal heart always receives its full complement of blood when it relaxes. But in Crile's cases the venæ cavæ were *engorged* and *tense* (see Experiment CIX, *Surgical Shock*), and yet they could not unload into the heart, because the cavities of the ventricles were almost obliterated by reason of cardiac spasm, strong systolic contraction, and very imperfect diastolic relaxation.

Henderson also found the heart, in rapidly fatal cases of shock, small, *contracted, and hard.* The same condition prevails in a less degree in cases less rapidly fatal.

Experiments that I made at the laboratory of Parke, Davis & Co. confirm me in this view. Dogs and rabbits were used. Nearly all were anesthetized by chloretone, introduced into the stomach, thus giving an even and reliable anesthesia. Artificial respiration was used. In several it was almost impossible to induce shock, because (as I now know) carbon dioxide was allowed to accumulate in the blood through imperfect respiration. The kymograph gave the pressure tracings by means of a cannula inserted into the carotid. The myocardiograph was attached to the walls of the right ventricle. Veratrone, which is a preparation of veratrum viride made by Parke, Davis & Co. for hypodermic use, was used to counteract the shock and to lessen the tachycardia and raise the blood pressure.

My experiments showed:

1. That whatever may be the effect on the vasomotor centre, the impulses of stimulation from the injured peripheral nerves are transmitted to the heart by its augmentor nerves (through the stellate ganglia), causing increased ventricular contraction, and that the rise in blood pressure is *consequent* upon this heart action largely if not wholly.

2. That when, by reason of long-continued stimulation

of afferent nerves, the animal is in a condition of shock, the amplitude of the heart beat is much diminished, and the diminution is entirely because of very incomplete ventricular relaxation, a condition that may justly be called tonic or tetanoid contraction.

3. That veratrone, which causes, when given to a normal animal, decided fall of pressure, given in a condition of partial or complete shock, will cause a *rise* of blood pressure, but to do this it must be given in doses much larger than the ordinary dose.

This action of veratrone goes far to disprove the theory of vasomotor exhaustion.

The combined testimony of Crile's experiments, as narrated in his work on *Surgical Shock*, of Henderson's experiments with carbon dioxide, and of my own, points almost conclusively to cardiac spasm as the true pathology of shock. Assuming this to be correct, the treatment must be directed to the relief of this condition. Crile attempts it by mechanical compression and by adrenalin. Henderson says that it is easily accomplished by increasing the amount of CO_2 in the blood. And I have sought the remedy among the cardiac relaxants or inhibitors, and have found that veratrum, while it is not the ideal remedy, will accomplish the desired result.

All this is concerning traumatic or surgical shock, uncomplicated by any considerable loss of blood. Whether the pathology of the many conditions that have been called shock is the same, I do not know. There is room for exact experimental work in differentiating these various conditions. Neither the collapse of hemorrhage nor that which occurs at the height of acute infectious diseases, nor that condition which follows septic peritonitis or perforation of an intestine, are to be properly called shock. But the pathology of mental, traumatic, or surgical shock is, I believe, cardiac spasm, excessive fulness of all the veins of the body (somatic and splanchnic) and comparative emptiness of the arteries. If

this condition be due entirely to a diminished amount of CO_2 in the blood, then, as Henderson says, the one method of treatment is to increase the CO_2, which certainly simplifies the treatment of this condition. If we seek to relieve shock by cardiac relaxants, they must be given in very large doses. For this reason veratrone is almost contra-indicated. Some other relaxant must be sought, possibly aconitine or berberine.

A careful study of the accompanying charts will make this more clear.

The upper tracings are heart tracings, recording the contraction and relaxation of the ventricles. The down strokes record cardiac systole, the up strokes, cardiac diastole.

The lower tracings record pulse beats and arterial pressure. All measurements are made from the "base line" just above the time tracings (seconds.)

It is interesting to study this demonstration of the action of adrenalin on the heart, in comparison with the influence of shock. Adrenalin is known to cause tonic contraction of the muscles of the arteries and of the heart. Now notice the tracings of the heart after it comes under the influence of adrenalin. The amplitude rapidly decreases to considerably less than before the administration of the adrenalin, but you will note that while the systolic tracings are markedly longer than before the adrenalin was injected, the diastolic tracings are much shorter, showing increased energy of contraction and very restricted dilatation. Compare this now with the illustration which shows the character of the heart tracings in shock. In both you find diminished amplitude of the heart beats, and in both *increase* of the systolic tracings over normal, and decided *decrease* of diastolic tracings. Both are alike; we know that adrenalin causes *tonic contraction* of the heart; must we not say then that shock causes the same condition?

HOSPITAL GYNECOLOGY.

By Robert L. Dickinson, M.D.,
Brooklyn, N. Y.

Gynecology exists as a specialty—as a well-defined section of the surgical art—because in actual practice the field of the general surgeon is found to be so large that he rarely has time to develop, to the full, details of pelvic diagnosis and certain matters of treatment, prophylactic, operative, and non-operative; as, for instance, skill in the study of the bladder and ureters, routine use of the proctoscope in cases of obscure pelvic pain, and vaginal attack in lieu of abdominal, wherever it is equally effective. Other things being equal, he is the best man for a particular set of disorders who houses in his cortex the greatest number of expedients and can most deftly develop them at his finger tips.

But if gynecology is entitled to an individual existence, it will do ill to attempt an isolated existence—a spinster specialism. Our particular work located in a hospital of diversified services must, as compared with a one-line institution, necessarily breed broader men and women, foster consultations with other departments, better the surgery of the gynecologist and the gynecology of the surgeon, and facilitate transfers—must, in other words, cherish the best interests of the patients and render them less likely to be considered mere vehicles for their utero-ovarian organs. Pelvic bigotry and uterolatry are passing, both in meeting-hall and operating amphitheatre. We should be, first and foremost, all-round medical

men, then surgical handicraftsmen, and, last of all, experts in one line.

Reason for Separate Service. In the organization of a hospital, gynecology should exist as a separate department wherever two conditions are met with, namely: a sufficient number of cases of female pelvic disorder to constitute a service and an individual equipped with adequate training in general and abdominal surgery who develops a special aptitude for the relief of the diseases peculiar to women. If divisions in hospital services are multiplied beyond a certain point, the services will not be well attended, for the number of beds allotted to a visiting cannot be such as to make it worth his while to make nearly daily rounds. In small hospitals the need is often well met by the appointment of a consultant who is accorded visiting privileges in his own or in referred cases; but even in institutions of moderate size it may happen that a general surgeon, either from manner or lack of inclination, is ill-qualified to foster and develop such a service.

The question is two-sided, of course. The gynecologist has got to be handy with an unsuspected gall-bladder or any work as far up as the diaphragm, and the general surgeon may not fail to couple his interval appendectomy with the needed cervix repair nor forget to underpin the suspended uterus with a pessary for a first encounter with the wash-tub.

In the interest of women and the institution the best skill available should be secured. In the "Utopian General" every visiting will hasten to make way for one better qualified and every man will recognize his limitations. Our hospital work will never receive the personal attention to daily details and the incessant supervision it demands until men are no longer obliged to subordinate it to earning a living—that is, until they are salaried, then required to attend a given number of hours a day.

Assignment of Cases. In a hospital where general and gynecological surgery live in peace side by side the following regulations have been found to work smoothly. It may be noted that this hospital has two hundred beds, and is located where prices are lower than in the borough of Manhattan.

To the gynecological service are to be referred all general admission cases[1] of women with disorders of the pelvic organs, excepting those directly due to existing pregnancy or caused by delivery or abortion occurring within a fortnight. But "any patient with a pelvic disorder referred directly to one of the surgical visiting staff or to an associate on the surgical staff shall be credited to his surgical service." Also, "Unless in labor, any pregnant patient with a disorder primarily gynecological (*e. g.*, ovarian cyst, ectopic gestation) shall be referred to the gynecological service. A female patient with minor pelvic ailments requiring operation and major conditions calling for general surgery shall be assigned to a surgical service." "When in doubt, reference should be to the general service." Diseases of the bladder in women belong to the gynecological department. The disposition of rectal surgical affections in women would be a matter for difference of opinion were it not that such affections rarely exist unaccompanied by other pelvic disorders.

It is a good thing to have ten-dollar-a-week patients classed as private. It makes for the self-respect of women of moderate means, such as school teachers; it permits members of other services to send in and operate on such cases, thereby adding to the income of the hospital; and it works out practically for the benefit of the surgeon by bringing to him a not inconsiderable tally of the smaller operation fees.

The Visiting Staff. Passing by theories of perfection, let us consider the actual conditions necessary for reasonable

[1] Free cases or those paying less than ten dollars a week.

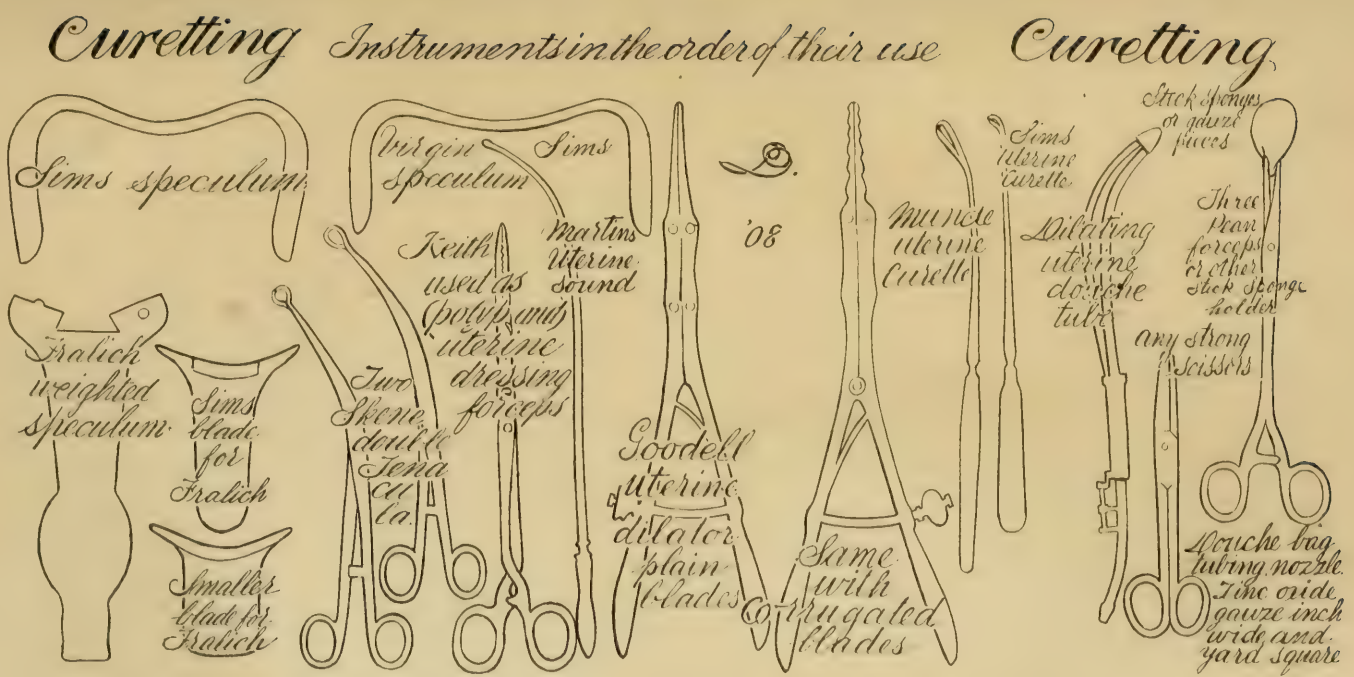
care of gynecological cases in hospitals. Barring curettings, repairs, and pelvic inflammations, they are found to be considerable operations. What is the irreducible minimum of rounds to be walked by the visiting? How many days a week? How many hours a day or week?

This will depend somewhat on feast or famine and upon the way operations group themselves; but, in general, the visiting should go complete rounds four or five days a week, and the associate the other days, one or the other making examinations within a day of admission and on discharge, and inspecting charts and dressings and drains on all patients.

Consultation. Should there be consultation before every major gynecological operation? Should there be a consultant gynecologist, and in what instances should he be called in? Or will too much delay be entailed thereby? Is a consultant ornamental only? Will conference with and examination by a colleague be more practical and expeditious?

If the visiting is a relatively young man, an active consultant is desirable, and one not too famous and busy and distant. The difficulties of adjusting hours with a man much sought after and the resulting delays are such that the best average consultation is with some surgical side-partner who can be readily captured and who will take an interest in the patient and keep it up. Hospital consultations are so easily obtained and so desirable in the interests of the patient, of diagnosis, and of mutual teaching, and for their medicolegal safeguards, that they should be more practised than they are. At present it is often found that they are consistently evaded, even where the regulations call for them.

Associates. The position of assistant—better labelled associate—visiting gynecologist calls for much tact. While he should speak as one having authority in his chief's absence, he must not jar the susceptibilities of the honorable the house staff. As between the associate and house officers, the claim of the house officer to the right of gaining clinical knowledge


Curetting Instruments in the order of their use Curetting
Sims speculum
Virgin Sims speculum
Keith used as (potts) uterine dressing forceps
Martins uterine sound
Fralich weighted speculum
Sims blade for Fralich
Smaller blade for Fralich
Two Skene double Jena Co.
Goodell uterine dilator plain blades
Same with rugated blades
Munde uterine curette
Sims uterine curette
Dilating uterine douche tube
Stick sponges or gauze pieces
Three pean forceps or other Stick Sponge holder
any Strong Scissors
Douche bag tubing nozzle
Two one gauze inch wide and yard square

Nurse's operation chart, reduced from life size. On a sheet of tracing linen each instrument is laid and an outline drawn about it, and the name is written across the outline. This insures completeness of outfit and the proper order of placing, and trains in right naming of instruments. Example curetting.

by assisting at operations—in which only one besides the operator sees anything—can be fairly met without detriment to the patient in this way: The associate should be first assistant at important private operations, and he may be first assistant in difficult and dangerous free cases. At the beginning of the term of the house officer as senior on gynecological duty the associate acts as first assistant, the house officer as second. As soon as this second assistant shows himself fit to be first assistant, he is to take this position, and the associate only attends by request, though notified of every operation. What operations will be given to the resident will depend entirely on his ability and whether he proves himself to be endowed with surgical sense or not. All that can be given him without detriment to the patient should be given, under supervision, near the end of the term. He has drudged many months in the hope of reaching this shining goal, and, though we who know what his practice will bring may smile at the small chances of using his experience and at his faulty sense of proportion, we may not deny him his coveted reward.

The ideal conditions exist only in institutions like that of the Mayos, where there is team work. The same staff, made up of individuals on ample salaries, selected for special fitness for each particular duty, renders dextrous, automatic, interlocking service. The next best *personnel* is developed by appointing a paid resident, who remains one or more years and trains changing crews. The worst method is the usual one, where anesthetist and assistant get their handicraft training at the cost of the patient, and a new outfit is broken in partly or wholly every three months.

House Staff Regulations. Gynecology presents some peculiar difficulties in the relations between the residents and the hospital patients. For the benefit of the future private patients of the house staff all practicable clinical experience must be given to the residents. In order that intelligent care

may be taken of the patients, particularly in emergency and subsequent to operation, the interne must know and see as much as possible. But it is not easy to make house officers comprehend that one great dread in entering a hospital, on the part of any woman, is the fear of exposure or questions or examination or, indeed, any professional contact with new doctors or young doctors; and also that insistence on their clinical privileges to an unwise degree will result in a reputation that will soon cut down any gynecological service. There are certain peasants and others whose feelings do not take offence at careful study. This careful study of history, physical conditions, and postoperative behavior may be of great importance to the recovery of any patient. But with the great majority one cannot be too particular concerning exposures and publicity. Wherefore, it is necessary to enforce a regulation usual in the larger hospitals, namely: that in private cases, except in emergency, no vaginal examination is to be made by the house staff without the sanction of the attending. The same holds true of the history of private patients, which is a confidential communication by the patient to her physician and which cannot continue to be so if spread upon the records. The statement of the diagnosis on the history blank is bad enough, many women think.

Gynecological Technique. For simpler and quicker operations, with the fewest hitches, for peace with economy, and for better training of house staff and nurses a certain *standardization of outfit and procedure* is desirable. This is particularly true when several operators use the same quarters. All ordinary cases readily group themselves within an average requirement, and are left to this usual schedule, but departures from the average or standard are readily made to fit the individual case or the individual operator. It is the only plan by which the various persons concerned can be held responsible. The practice of handing down traditions from one house officer to his successor or from

one operating room head nurse to another produces many a hiatus and allows a resident or nurse to interject experimental variations without sanction. Any system, however, presupposes a degree of harmony on the part of the operators and a measure of flexibility in the plan itself. Mutual concessions are requisite to secure a certain uniformity. Variations are not ruled out, but merely reasonably restricted. As an example, if a canvass of the staff results in agreement on a certain small number of needles and of sizes, the instrument room can be required to keep these always in stock. Again, the omission, after operation, of some simple detail that should not have needed specifying cannot be excused for not having been ordered. Further, if one knows the kit for a given operation, it is easy to modify the list. Here, for example, is the detailed schedule for preparation of patients used by Brooklyn Hospital, of which each of the house staff and every woman's ward should have its copy. Here is a reduced outline of a table prepared for curetting. The nurse has such a sheet of tracing linen for each operation, which sheet, before sterilizing, she must cover with the instruments, to see that each is in place, and which teaches her the order in which they should lie after sterilizing.

NURSES' DIRECTIONS IN FULL.

Preparation for Vaginal Operations.

These directions are general. Modification will be made to suit special cases by the Visiting Surgeon or the House Staff.

Operating hour is forenoon.

(*a*) Food.
(*b*) Bowels.
(*c*) Bath.
(*d*) Local cleaning.
(*e*) Quiet.

Food. Light supper day preceding operation. No food on the morning of the operation. Give black coffee or clear beef tea early. Give water or carbonated waters, hot or cold, freely for day and evening preceding operation, and, if desired, during night until within one hour of operation, to fill bloodvessels and to prevent thirst. *Exception:* If the operation is to be done in the afternoon, a light breakfast may be given.

Bowels. The House Surgeon will give orders.

General Bath. A deep tub bath, ten to fifteen minutes, hot as can be comfortably borne, with scrubbing of abdomen, thighs, and genitals, on day preceding operation. *Exception:* Omit if patient has had one at home that day, and give in bed if patient is weak.

Local Cleaning. Shave; scrub; douche; place protective dressing.

Get Ready. Scissors; safety razor; douche bag; nozzle; bottle of hot water; bottle of warm bichloride solution, 1 to 4000; green soap; basins; gauze; vulvar pad; towels and rubber sheet.

See that the razor is sharp, that it is freshly wiped with pure carbolic acid and then dried with sterile gauze, not boiled; the water hot; the douche bag filled; the bed protected; the lighting sufficient. Cover the patient carefully to avoid exposure and chilling. Unless the hair is scanty, clip it moderately short. Make a profuse lather with hot water to soften hair; shave gently and thoroughly; clear the cut hair frequently from a safety razor.

Renew the hot water. Begin the cleaning in the folds between greater and lesser labia, then draw back the prepuce to look for any white secretion beneath it. Let no sponge that touches the anal region make any other contact. Gauze suffices. It scrubs sharply, and is to be changed often. The upper thigh, the buttocks, and lower abdomen are successively scrubbed, dried, and covered.

For the vaginal *douche,* see that the solution is warm and the glass nozzle newly boiled. For the virgin who has never used douches, the glass catheter or rubber catheter should be used as a nozzle, in the dorsal posture, with care and with good illumination, to make sure it enters the hymen right. Then hold the greater labia together in order that the fluid may balloon every fold of the vagina, and by its sudden exit flush out all secretions. One quart suffices. Place pad over vulva. If bowels move thereafter wash anal region.

Quiet. The patient is to be put to bed upon entering. Books and visitors will occupy her mind happily, unless she is exhausted. No hospital tales or gossip.

Just before starting for operating room, patient must sit up and urinate, unless prostrated; catheter only to be used when ordered. *Exception:* In case of emergency operation, the general bath is to be omitted, unless ordered by the House Surgeon, and local cleaning in certain cases is done on the operating table.

Preparation for Abdominal Operation.

Operating hour is forenoon.

(*a*) Food.
(*b*) Bowels.
(*c*) Bath.
(*d*) Cleaning.
(*e*) Quiet.

Food. Light supper day preceding operation, unless otherwise ordered by the House Surgeon. No food on the morning of the operation, but give black coffee or clear beef tea early. Give water or carbonated waters, hot or cold, freely for day and evening preceding operation, and, if desired, during night until within one hour of operation, to fill bloodvessels and to prevent thirst. *Exception:* If the operation is to be done in the afternoon, a light breakfast may be given unless otherwise ordered.

Bowels. The House Surgeon will give orders.

General Bath. A deep tub bath, ten to fifteen minutes, hot as can be comfortably borne, with scrubbing of abdomen, thighs, and genitals, day preceding operation. *Exception:* Omit if patient has had one at home that day, and give in bed if patient is weak.

Local Cleaning. Shave; scrub; douche; protective dressing.

Get Ready. Scissors; safety razor; douche bag; nozzle; bottle of hot water; bottle of warm bichloride solution, 1 to 4000; green soap; gauze; vulvar pad; abdominal binder; towels and rubber sheet.

See that the razor is sharp, that it is freshly wiped with pure carbolic acid and then dried with sterile gauze, not boiled; the water hot; the douche-bag filled; the bed protected; the lighting sufficient. Cover the patient carefully to avoid exposure and chilling. Unless the hair is scanty, clip it moderately short. Make a profuse lather with hot water to soften hair; shave gently and thoroughly; clear the cut hair frequently from a safety razor. Renew the hot water. With a profuse lather, scrub the skin five minutes thoroughly, until reddened. Rinse well before using bichloride. Dry vigorously, with friction. Apply dry sterile gauze dressing. The patient must not be cold or wet all night.

Quiet. The patient is to be put to bed on entering. Books and visitors will occupy her mind happily, unless she is exhausted. No hospital tales or gossip.

Just before starting for the operating room, patient must sit up and urinate, unless prostrated. Catheter only to be used when ordered.

Exception. In case of emergency laparotomy, omit general bath and laxative. Omit enema, unless otherwise ordered; attend to local shaving and cleansing, if ordered; in certain cases it will be done on operating table.

Relation of Hospital and Dispensary. Let us harp on the same string always. The interest of the patient, the

patient, the patient, first, and last, and in between. With it dovetails accurately the interest of the institution and of the visiting and of the house staff. If at first glance it seems to square least with medical education, yet truly it does so square in any broad and farsighted view of the matter. Now, the best-care of a woman is impossible where outdoor and indoor treatment wofully fail to interlock, as in most institutions. The patient should come from dispensary to hospital with a provisional diagnosis and any important facts of the history. After operations she must be watched most carefully, returning to the dispensary with her statement of operation and her needs. The form of report to the hospital on admission may be of hospital size for filing with the history, say an admission sheet. The form of report to the dispensary may well be of card size if the dispensary records are card records. In any case intelligent care calls for a report.

The second way in which interdependence may be worked for the good of all is to have the dispensary the natural order of promotion to the hospital. House staff, dispensary, visiting staff, consulting staff—this is the natural progression. If the top man in a department of the dispensary is the lowest man in the same department in the hospital, a properly correlated system is under way. Also, the patient is followed into the hospital and out again by the same man. To keep the dispensary up to standard and in touch with the hospital, the visiting should stand ready at stated periods to examine certain cases at the request of the occupant of the dispensary chair.

The gynecological department in the dispensary should be equipped for the diagnosis of diseases of the bladder and rectum in woman and be qualified to treat the simpler cases. For instance, chronic constipation should always be investigated for the medical man in order to locate mechanical causes, for no constipation is cured that is merely fitted with a pill.

Much that has been advocated as to the desirable and practical solution of proper hospital care of women is prevented by:

1. Assumption by an individual of more work than can be faithfully or honestly or even cursorily performed by any one man, and reception by an institution of more patients than it is equipped to treat.

2. A multiplicity of hospitals which are too small to be well-outfitted and well-manned (where a merger should take place).

3. Defective system. "The American is a splendid organizer, but he does not know how to make his methods simple," said an Englishman lately.

HOSPITAL HISTORIES.

By Robert L. Dickinson, M.D.,
Brooklyn, N. Y.

In recasting the medical and surgical records of Brooklyn Hospital, the forms from a large number of institutions were gathered. As a result of this study of methods made by the surgeon, Dr. John E. Jennings, and myself, and of the experience of the method in operation, the following conclusions are submitted:

Simplicity and clearness, ease of reference at bedside or in file or volume, portability and compactness—these practical utilities should govern the plan. For the routine records of the ordinary undermanned hospital an irreducible minimum is to be decided on, a definition of duties drawn up, and then the regulations enforced. On this foundation may be built, later, any research work for which there are brains, men, money, and time. But it must be recognized as such, and there must be eliminated the confusion now existing between the two objects of hospital histories, namely, a record of those facts essential to the care and recovery of the patient and that entirely praiseworthy and altogether different matter, a series of scientific observations. Thus, student and interne should not grow discouraged, and leave, untrained in sense of proportion and perspective, to drop history keeping in private practice the while our institutional chronicles vacillate between two extremes—essays and waste paper. It is to be made clear that one paragraph of synopsis of opera-

tion entered as the patient is rolled out of the operating room is worth pages indited the second evening after. Convalescences and dressings and condition on dismissal are also matters not to be overlooked.

1. Methods and *sizes standardized* by business usage should be employed. The card index, the folder, and the vertical file are the basis of convenience. While card histories are preferable for private practice, because they will be carried to the bedside and the hospital, in institutions sheet records are better than cards. Brooklyn Hospital abandoned cards after ten years' use, and we hear of no hospital that uses them now except in dispensary work.

2. The page should be of one of the standard sizes; that is, one for which the market furnishes stock supplies in the way of filing devices, and not a printer's offhand suggestion. A convenient proportion is letter size, not to exceed $9\frac{1}{4}$ x 11 inches.

3. Of *printed forms* a minimum number should be allowed. One color suffices for all services. To differentiate services, color or seal on the bedside cards and a seal to correspond pasted on the folder, classify and identify cases and histories, in conjunction with the proper entry at the head of the history. As an example of compactness, the New Haven clinical chart may be instanced. Under the temperature chart stand the entries of urinalysis and blood tests, while on the back we make those relatively infrequent entries, examination of stomach contents, feces, and sputum. B. i. d. and q. 4 h. temperatures go on one chart by dividing the longer day from its neighbor with a red line, and thus preserving our record in sequence on one page. The final sheet, ultimately the front sheet of the history, must give at a glance a summary of all important matters, and yet calls for no duplicate entries; while those entries that develop late, such as signatures and the final pathological decision, naturally fall here.

Eight blank forms cover the essential needs of a general

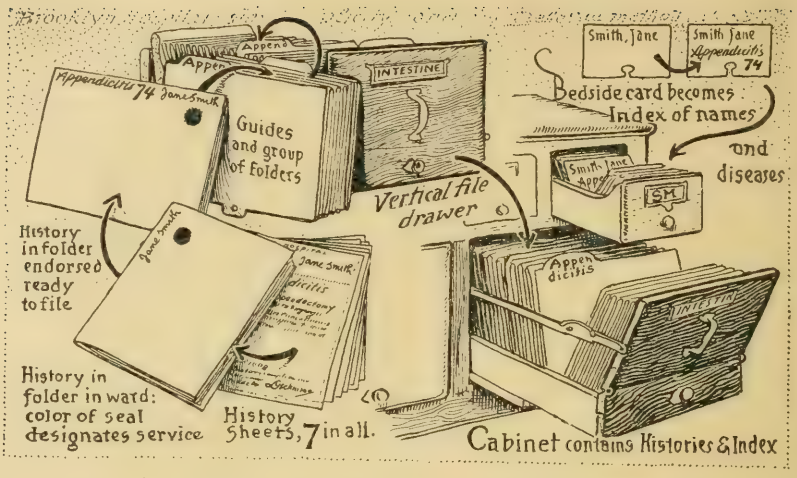

Smith, Jane
Smith Jane Appendicitis 74
Bedside card becomes Index of names
and diseases
Appendicitis 74 Jane Smith
Guides and group of folders
INTESTINE
Vertical file drawer
SM
History in folder endorsed ready to file
Jane Smith
History in folder in ward: color of seal designates service
History sheets, 7 in all.
Cabinet contains Histories & Index

FIG. 1.—Vertical letter-file method applied to history-keeping in hospitals (or offices). A manila folder carries the various sheets of the history. The color of the seal denotes the service to which the patient belongs, and corresponds with the color on the bedside card. The histories are piled, by services, at the nurse's desk, and delivered to each bed during rounds, or else hung by small clips at the head of each bed. After the patient's discharge each is filed by principal disease and serial number thereunder, cross indexing the complications and storing in the drawers until bound. This is the Brooklyn Hospital history and the Bellevue Hospital indexing. The labelling is on this unusual location, because, in filing, the little portfolio is set among others on its open edge, and turns like a big card in a card catalogue. The contents do not spill out. Any completed history between discharge of patient and binding is accessible in sixty seconds.

hospital, namely: (*a*) Front, or summary; (*b*) admission history, with two special admission blanks (*c*) and (*d*); (*e*) gynecological history; (*d*) obstetric history; (*e*) operation; (*f*) continued history; (*g*) temperature chart; (*h*) bedside notes. Where a considerable number of histories follow one form, as in obstetrics and gynecology, these are printed in full by the hospital, but blanks for special research are to be paid for by the investigators; they will be of standard size and style, and they will constitute part of the official history and are not to be removed from the files.

4. To use *both sides of the paper*, and to do away with heavy clips and holders, the little manila portfolios (called *folders*) used in the vertical file systems to hold letters, hold the history. Clips or snaps or punched holes have not been found necessary. The folder is labelled with the name and the seal of the service, not on the usual free edge, but lengthwise close to and along the back toward the right corner. When filed, the diagnosis goes on the left-hand corner. The folders lie bunched at the nurse's desk, and on rounds she carries the light pile from bed to bed, having them in proper order, and handing each at its needed time. As they do not hang at the bedhead, the diagnosis and the operation can be in the history, and the history is confidential (unseen by patient and friends) and complete. If more than one service is represented in a long ward, the nurse has at her table the histories grouped by services (by colored seals). If the histories were to be kept at the bed, I recommend the only light, surgically clean, and concealing holder—a fine new aluminum portfolio. It is all metal, has a spring back that holds one sheet or thirty, is thin, without projections, and bears no enamel to be chipped. That for letter size history blanks is $12\frac{3}{4}$ x $10\frac{3}{4}$ inches, and is known as Sieber & Trussell, St. Louis, No. 675. It costs one dollar and sixty cents each in hospital lots, whereas the folders cost part of a cent each.

5. *A patient and his history are never to be separated,* in whole or in part. With the discharge of the patient the history goes to the office (or record room), to be kept, in its folder, in vertical file drawers under service heading. The office (or record clerk) is responsible. Here the visiting signs and the historian (or record clerk) enters the diagnosis on the folder, and files under "principal disease," according to the official nomenclature. Here the pathologist makes his final entry. If the history does not come down with the patient it knocks around a house officer's room until he has a fit of finishing; or if only part comes to the office, some pages may go astray. It is a poor time to locate a missing sheet or to revive the shadow of the memory of an appendix after an interne has had his diploma signed and has disappeared.

Uniformity of nomenclature is essential, whether in indexing the cases in a little hospital or the causes of death in two hemispheres. I have carried this hospital indexing question to the highest authorities in this country. The Census Office and *Index Medicus* make the same recommendation. Dr. Cressy Wilbur, head of the Bureau of Vital Statistics of the Census, and the librarian editors in the Surgeon-General's Office say the best schedule for our purpose is that embodied in the *Nomenclature of Diseases of the Royal College of Physicians of London,*[1] which is very complete and in four languages. It includes full lists of injuries, operations, tumors, malformations, etc. An international agreement on classification that will take in not only the present twenty-nine countries, but Germany and England as well, is hoped for, but this cannot be accomplished before 1911 or 1912. The national societies of specialists, the Government departments, and the American Public Health Association are expected to collaborate with the American Medical Associa-

[1] Wyman & Sons, Fetter Lane, E. C., London, 1906; fifty cents.

tion in framing a schedule to be submitted at an international meeting planned for Washington in 1910. To bring the system down to practical working size Bellevue Hospital in New York has published a pocket summary entitled *Nomenclature of Diseases and Conditions for Bellevue and Allied Hospitals.* This must be followed rigidly in entering diagnoses or histories. It is excellent, and is now under revision after five years of use.

RESPONSIBILITIES CONCERNING HISTORIES.

A working plan is recommended—a one-man responsibility, as follows:

(*a*) *History Committee.* A standing committee of one, a member of the professional staff, is answerable to the medical board and to the board of managers or trustees. The committee plans methods, blanks, a surgical syllabus, a medical syllabus, and all necessary regulations, and secures their approval by the board named. He puts these regulations into effect and into type down to minute detail, leaving nothing to tradition. He is assisted by a substitute, to provide for absence or illness—say a junior member of the staff. The details of management and the ordering of supplies and filing histories are in the hands of a historian, or history clerk, who should be salaried for this important drudgery in any but a small hospital, even if the visiting staff have to divide up the cost. The name index is kept by the office force. A history from discharge to binding is under lock and key or under supervision in a vertical file in the office—in a place convenient for final entries or signatures.

(*b*) *Visiting Staff.* However good the method and however eager the interne, without a certain degree of interest on the part of the attending, no histories will be of value. To instruct, to commend good work, in some cases to dictate or

make entries, as of operation details, and to look over and sign—these are essential. In case of failure on the part of any visiting to sign histories, the fact is reported to the medical board by the committee. A fixed date is designated for signing, such as the second and fourth week of each month.

(*c*) *House Staff.* Here again responsibility begins at the top. The house officer at the head of a staff cannot be allowed to excuse himself for imperfect work on the part of his history taker. He is answerable. It is for the house surgeon to write up promptly all histories of operations. The heads of the operation should be entered in the operating room. No man's memory is twenty-four hours long. The lever wherewith to lift the plane of histories is refusal of promotion or postponement of signature to the hospital diploma where a house officer's histories are defective. One enforcement of such a penalty is handed down as a tradition. It suffices.

As a sample of history regulations which leave nothing to tradition or unauthorized alteration—where nothing is taken for granted—the following is submitted. Adaptation to meet special needs can be readily made. The regulations are drawn up to fit the simplified history advocated above, coupled with the Bellevue Hospital method of indexing and filing.

REGULATIONS GOVERNING HISTORIES, BROOKLYN HOSPITAL, 1908.

1. The Trustees require accurate and reasonably complete histories of all patients received into the institution. The Superintendent of the hospital is the representative of the Board of Trustees in enforcing this requirement. The supervision of these records and the arrangements of methods and

details is placed by the Board, upon recommendation by the Professional Staff, in charge of the Committee on Histories of the Professional Staff (hereinafter called the Committee), subject to conference, at reasonable intervals, with the Superintendent of the hospital; and, on the matter of nurses' entries, with the Superintendent of the Training School. The Committee, with the aid of the Historian, gives instruction to the House Staff, sees that the histories are properly kept up, and supervises filing and indexing. Requisitions on the office for necessary material for histories should be signed by the Committee or the Historian. *Without the sanction of the Committee, no alterations in method are to be made.* In the absence of the Committee, the Substitute will act in his stead.

2. The Resident at the head of each service shall be immediately responsible for the histories of that service (except for the chart of the temperature and the bedside notes of the nurses), but he may delegate to one of his subordinates certain duties or entries after conference with the Committee.

3. Entries are to be made in ink (but sketches or outlines may be in pencil or crayon). Each part of a history (excepting temperature sheet and bedside notes) must be signed by the writer, but initials will suffice for brief memoranda. Underscoring of headings or important matters is desirable, such as the titles of different operations performed on one patient, the chief complaint, hemorrhage, etc. Due attention to the recording of conditions and treatment of surgical cases *after* operation and of medical cases during their *later course* and convalescence is required of the House Staff; as, for example, consultation and the result, complications, suppuration. The last name of a patient is to be placed *nearest the corner*—on the sheet last, on the card, first. "Miss" or "Mrs." precedes the Christian name of a female adult.

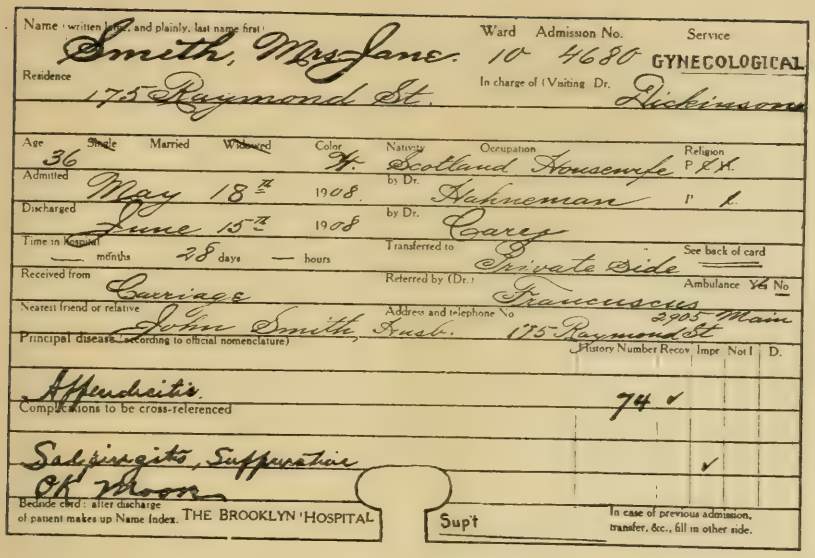
The provisional diagnosis is to be entered on the admission sheet when ascertained, and a complete diagnosis is to be

filled in on the front sheet as soon as it is known. Admission history blanks will be kept in the Receiving Ward. The house officer admitting the patient will enter on the admission history the name, the doctor referring, and, in pencil, the provisional diagnosis, and the sheet will accompany the patient to the ward. The diagnosis on the bedside card will be entered by the house officer who discharges the patient. In the interest of uniformity and good indexing, the official titles of diseases, injuries, malformations, and tumors must conform without deviation to the *Bellevue Hospital Nomenclature.* To determine the heading under which to place a disease or injury not included in the above, there shall be consulted the *Nomenclature of Diseases of the College of Physicians of London,* edition of 1906 (hereafter called the *London Nomenclature*).

4. The following are the blanks in use, each being designated by the proper title on the upper left corner:

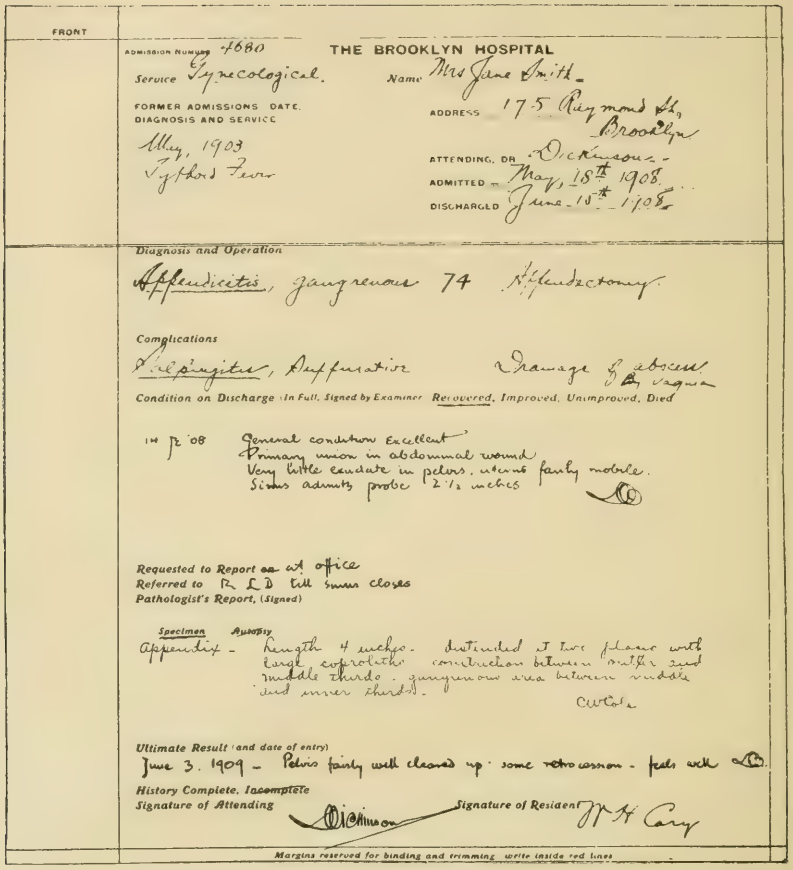
Bedside Card. The entries on the front of the card as far down as "principal disease" will be filled in by the office or admitting officer, and the card sent to the ward at the earliest available opportunity. The diagnosis ("principal disease") and complications will be filled in by the house officer who discharges the patient, and these will conform with the like entries on the front sheet. In case of death, these entries will be filled in as soon as practicable by the house officer. In case of death or transfer, the proper entries on the back of the card will be made by the house officer. On discharge of the patient, card and history accompany him to the office. The cards will be filed alphabetically by the Record Clerk in the drawers provided for that purpose. The history number will be added by the Historian (or Record Clerk) when filing the histories by disease.

Front. This is to be filled out by members of the House Staff (or Visiting Staff) when the facts called for are developed, but does not take its proper position until the history reaches


Name (written legibly, and plainly, last name first) Smith, Mrs Jane. Ward 10 Admission No. 4680 Service GYNECOLOGICAL
Residence 175 Raymond St. In charge of (Visiting Dr.) Dickinson
Age 36 Single Married Widowed Color W. Nativity Scotland Occupation Housewife Religion P.R.X.
Admitted May 18th 1908. by Dr. Hahnemann P. L.
Discharged June 15th 1908 by Dr. Carey
Time in Hospital — months 28 days — hours Transferred to Private Side See back of card
Received from Carriage Referred by (Dr.) Francisscus Ambulance Yes No
Nearest friend or relative John Smith, Husb. Address and telephone No 175 Raymond St 2905 Main
Principal disease (according to official nomenclature) History Number Recov Impr Not I D.
Appendicitis. 74 ✓
Complications to be cross-referenced
Salpingitis, Suppurative ✓
OK Moon
Bedside card: after discharge of patient makes up Name Index. THE BROOKLYN HOSPITAL Sup't In case of previous admission, transfer, &c., fill in other side.

In case of death, or transfer, or previous admission, fill in as required.
Father's name Father's nativity
Mother's name Mother's nativity
Years in U. S. Years in N. Y. City Property Yes No
Date of death Moribund on admission Yes No
19... A. M. P. M.
Certified by Dr Coroner's case Yes No
Transfer, date 18 May 08 Transferred without treatment
Transferred to Private Room 6 by Dr. M. W. Osborn Supt
Transferred to by Dr.
Insubordination Discharged on own responsibility Release signed Yes No
Previous admissions
Date Disease and history No.
Date Disease, history No
Date of order June 1908 No. ordered 1000

FIGS. 2 and 3.—Bedside card: front and back. These are in various colors, so that where more than one service has patients in a ward they may be identified at a distance. According to color, the name of the service is printed in the right upper corner. In a public hospital the pedigree on the back is also filled out on admission. Reduced from 4 x 6 inches. In lieu of color in bedside cards, which is somewhat costly and complicated, a satisfactory designation may be made by a big manila baggage tag bearing a large paper seal of the same color as that on the folder.



FRONT

ADMISSION NUMBER 4680 — THE BROOKLYN HOSPITAL

Service Gynecological. — Name Mrs Jane Smith

FORMER ADMISSIONS DATE, DIAGNOSIS AND SERVICE

May, 1903
Typhoid Fever

ADDRESS 175 Raymond St, Brooklyn

ATTENDING, DR Dickinson

ADMITTED May, 18th 1908.

DISCHARGED June 15th 1908.

Diagnosis and Operation

Appendicitis, gangrenous 74 Appendectomy.

Complications

Salpingitis, Suppuration Drainage of abscess By vagina

Condition on Discharge (In Full, Signed by Examiner Recovered, Improved, Unimproved, Died

14 Jy 08 General condition Excellent
Primary union in abdominal wound
Very little exudate in pelvis, uterus fairly mobile.
Sinus admits probe 2½ inches

Requested to Report on at office
Referred to R L D till sinus closes
Pathologist's Report, (Signed)

Specimen Autopsy

Appendix — Length 4 inches. Distended & two planes with large coprolith. constriction between outer and middle thirds. gangrenous area between middle and inner thirds.

C W Cole

Ultimate Result (and date of entry)

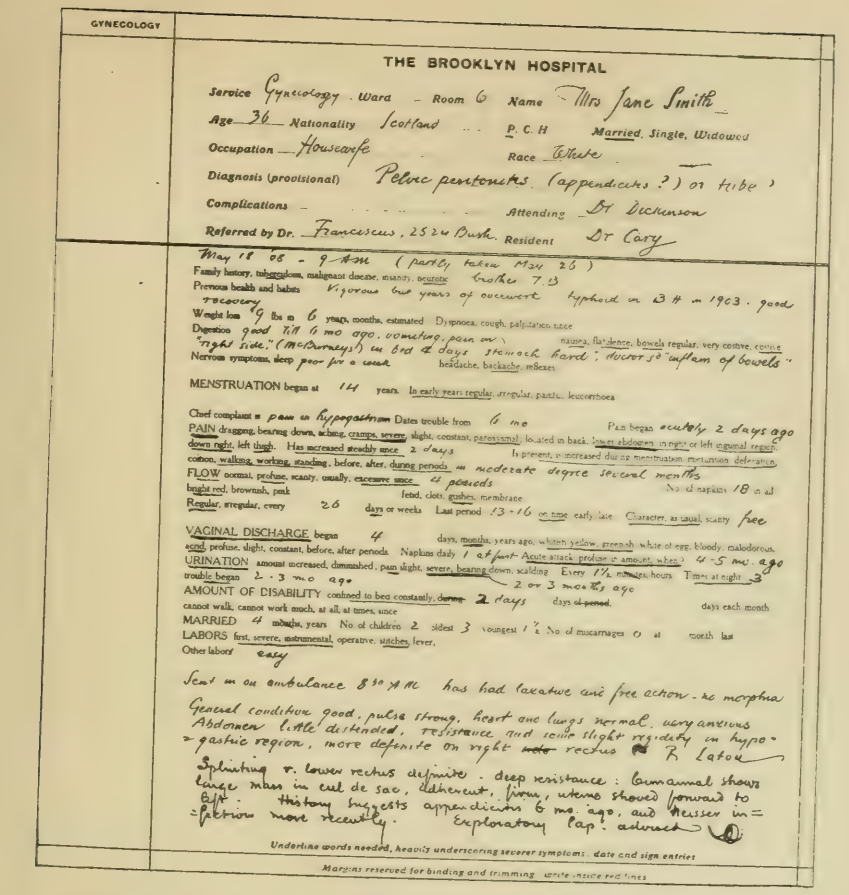
June 3. 1909 — Pelvis fairly well cleared up. some retrodisplacement. feels well

History Complete, Incomplete

Signature of Attending Dickinson Signature of Resident W H Cary

Margins reserved for binding and trimming write inside red lines

FIG. 4.—Reduced fac-simile of front page. This is a summary, and contains final diagnosis and pathological report and signatures.



GYNECOLOGY

THE BROOKLYN HOSPITAL

Service Gynecology Ward — Room 6 Name Mrs Jane Smith

Age 36 Nationality Scotland P. C. H Married, Single, Widowed

Occupation Housewife Race White

Diagnosis (provisional) Pelvic peritonitis (appendicitis ?) or tube ?

Complications Attending Dr Dickinson

Referred by Dr. Francescus, 2524 Bush Resident Dr Cary

May 18 '08 - 9 AM (partly taken May 25)

Family history, tuberculosis, malignant disease, insanity, neurotic broken 7 13

Previous health and habits Vigorous two years of excellent typhoid in 3 # in 1903. good recovery

Weight loss 9 lbs in 6 years, months, estimated Dyspnoea, cough, palpitation, taste

Digestion good till 6 mo ago, vomiting, pain on nausea, flatulence, bowels regular, very costive, constipated

"right side," (McBurneys) in bed 4 days stomach hard; doctor said "inflam of bowels"

Nervous symptoms, sleep poor for a week headache, backache, reflexes

MENSTRUATION began at 14 years. In early years regular, irregular, painful, leucorrhoea

Chief complaint = pain in hypogastrium Dates trouble from 6 mo Pain began acutely 2 days ago

PAIN dragging, bearing down, aching, cramps, severe, slight, constant, paroxysmal, located in back, lower abdomen, in right or left inguinal region, down right, left thigh. Has increased steadily since 2 days Is present, increased during menstruation, micturition, defecation, coition, walking, working, standing, before, after, during periods in moderate degree several months

FLOW normal, profuse, scanty, usually, excessive since 4 periods No of napkins 18 in all

bright red, brownish, pink fetid, clots, gushes, membrane

Regular, irregular, every 26 days or weeks Last period 13-16 on time, early, late Character, as usual, scanty free

VAGINAL DISCHARGE began 4 days, months, years ago, whitish, yellow, greenish white of egg, bloody, malodorous, acrid, profuse, slight, constant, before, after periods Napkins daily 1 at first Acute attack, profuse in amount, when? 4-5 mo. ago

URINATION amount increased, diminished, pain slight, severe, bearing down, scalding Every 1½ minutes, hours Times at night 3

trouble began 2-3 mo ago 2 or 3 months ago

AMOUNT OF DISABILITY confined to bed constantly, during 2 days days days each month

cannot walk, cannot work much, at all, at times, since

MARRIED 4 months, years No. of children 2 eldest 3 youngest 1½ No. of miscarriages 0 at month last

LABORS first, severe, instrumental, operative, stitches, fever,

Other labors easy

Sent in on ambulance 8.30 AM has had laxative and free action - no morphia

General condition good, pulse strong, heart and lungs normal, very anxious

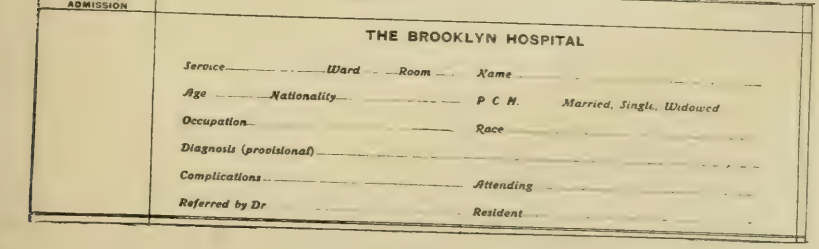
Abdomen little distended, resistance and some slight rigidity in hypo-gastric region, more definite on right ~~side~~ rectus R Latou

Splinting r. lower rectus definite. deep resistance: bimanual shows large mass in cul de sac, adherent, firm, uterus showed forward to left: this tory suggests appendicitis 6 mo. ago, and thesser in-flation more recently. Exploratory lap: advised

Underline words needed, heavily underscoring severest symptoms: date and sign entries

Margins reserved for binding and trimming write inside red lines

FIG. 5.—Reduced fac-simile of gynecological admission sheet. It covers nearly every possible symptom and carefully specifies amount of disability. Outlines of the pelvis and abdomen are stamped or pasted on its back for sketches of tumors and displacements and exudates.



HISTORY ADMISSION

THE BROOKLYN HOSPITAL

Service Ward Room Name

Age Nationality P C H. Married, Single, Widowed

Occupation Race

Diagnosis (provisional)

Complications Attending

Referred by Dr Resident

FIG. 6.—Heading of admission sheet for medical and surgical cases.

Methodist Episcopal Hospital.

Brooklyn, New York.

Hospital No. Service No.

OBSTETRIC CASE RECORD

Age Name

Service of Drs. S. M. W. Date of Admission

In Charge of Dr. Occupation Nationality

Sent in by White, colored P. C. H. Para

Summary of Case

Abnormal Features

Family History Tuberculosis, insanity

Previous History Rheumatism, scarlatina, diphtheria, disease of the kidneys, disease of the heart, tuberculosis, malarial fever, insanity, operations

Pelvic History Menses began at yr Regular, irregular, every days, with without pain amount normal, scanty, excessive, leucorrhœa free, slight, acute, began when? Cystitis

Pelvic diseases and operations, with dates

Married months years Miscarriages, number month last

Previous Pregnancies: vomiting, headaches, edema, convulsions

Previous Labors: easy, difficult, operative Hemorrhages, stitches, fever

Children born alive, dead Last previous labor

Present Pregnancy vomiting, headaches, edema, convulsions Bowels regular, costive

Last menstruation began Quickening Confinement due

EXAMINATION ON ADMISSION Before Labor; In Stage of Labor.

General Condition heart lungs

Circulation varicosities edema,

Breasts nipples well formed, prominent, flat, retracted, creased

Abdominal and pelvic peritoneum, fat tension striæ new, old

Uterus Height of fundus above symphysis contractions Liquor amnii excessive, not excessive

Child's Back (mother's front, back, left, right), child's head, location

Child's Heart, Location Rate Movements present, absent

Presentation above, in, below brim Position

Pelvis Sp. I Cr. I Et. conj Diag. conj. Estimated internal con

Other Measurements

Genitals Perineum intact, laceration Varices

Vagina, secretion laceration roomy, small

Cervix position os externum admits fingers, os internum admits

Uranalysis

FIG. 7.—Obstetric sheet, reduced from $10\frac{1}{4}$ x $11\frac{1}{4}$ inches. Only the essentials are admitted.

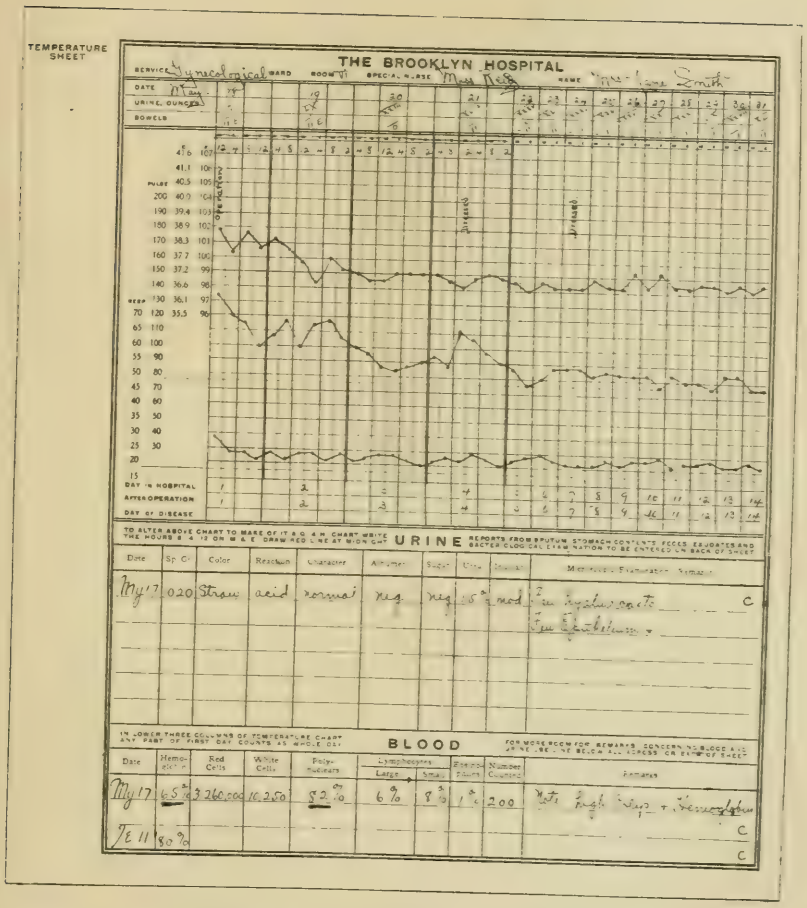


FIG. 8.—Temperature sheet, reduced in size: to make a q. 4. h. chart from this: the hours 4, 8, 12 are placed at the top of the column and a red line drawn for midnight.

OPERATION

THE BROOKLYN HOSPITAL

ANESTHESIA Date May 18th 1905 Name Smith Mrs Jane

Begun 1.40 A.M., ~~P.M.~~ Stopped 2.20 ~~A.M.~~, P.M. Operation begun 2.0 ended 2.20 P.M.

Duration — hour 40 minutes Duration — hour 35 minutes

Nitrous Oxide minutes: Ether ~~3~~ oz: Chloroform oz: Local kind. am't.

Complications and medication during anesthesia Operator, Dr. Stedman

Struck Swept 9-30 hypo

Mucous secretion abundant Anesthetist, Dr John E Ryder

OPERATION (Title, for Indexing; Full Description, Signature of Operator and House Surgeon)

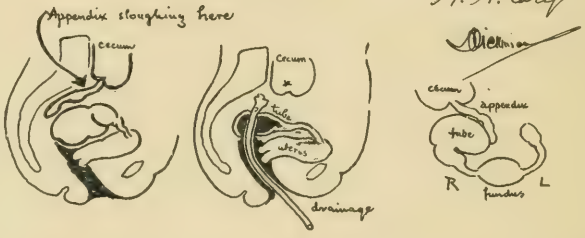
1 Appendectomy Appendix lies into pelvis to right of promontory, in adhesions to internal right tubal mass and bowel. Distended, with gangrenous spot.

2. Drainage of right pus tube through Cul-de-Sac. Lemon Rigid Sac Self retaining drainage Tube.

Four inch incision outer edge right rectus. Net worm sutures.

W. H. Cary

Diellman



Drainage; rubber tubing, 1 glass tube. ; wicking, pieces. Date Removal May 23 — R.L.D.

Pack; number of pieces and material 1 3 O. Gauze Vag Date of Removal May 27th 08 - D.H.C

Stitches requiring removal, number, material 5 silk worm Date of Removal June 2nd D.H.C

Margins reserved for binding and trimming; write inside red lines; date and sign entries.

Fig. 9.—Fac-simile of operation sheet, reduced in size. It covers the anesthesia blank, and the drainage blank often used.

HISTORY CONTINUED

BEGIN WITH THIS SIDE OF THE SHEET

THE BROOKLYN HOSPITAL

Name

Fig. 10.—Heading of continued history sheet.

BEDSIDE NOTES

BEGIN WITH THIS SIDE OF THE SHEET

THE BROOKLYN HOSPITAL

HEAD NURSE.. Miss H. Sehi WARD 10 Room 6 NAME Mrs. Jane Smith

DAY OF MONTH.	HOUR	TIME	PULSE	MEDICINE	TREATMENT	NOURISHMENT	REMARKS
18 May	9						Emergency - Bed. Prepare abdomen for immediate operation. Pt prepared Dry Sterile Compresses applied. S.S. Enema returned with fairly good results. Sent to O.R. at 9.35 a.m.
	9.15	3 2	÷ E				
	11.30	3 VI					Returned at 12.25 P.M.
	4		÷ E	S.S. Enema 8 x n for gas		Clear fluids in small quantities	Pulse 80. Strong. Enema at 4 P.M. returned. Rectal tube passed and enema returned. Some feces + gas
					Hot water 2 qts 4 P.M.		Pt complains of sharp pain in side. Vomited clear fluid at 4 P.M.
	11.30	3 XI		Morph Sulph gr ¼ 12 M.			Slept from 9 to 9.25 P.M.
19	9 a.m.	3 XI				Water 2 qts 8 a.m.	Very restless until Mid-night
				S.S. Enema 8 x n for gas		Coffee 2 ℥ 8 a.m.	Slept at long intervals until 4 a.m. Pt Side less. Thirst A.M.
	1.30	3 I	÷ E				Circulation of gas. Specimen of urine sent to P.D. S.S. Enema at 1.30 P.M. expelled 0 + some feces + gas. To be Enema repeated with
	4	3 I	÷ E		B.H. Enema ½ strength	Beef Tea 5 milk	Some gas. S.S. Enema 1.30 P.M. Later returned with particles of feces.
	7.30	3 XII					Slept well until Mid-night
	8.30	3 IV		Veronal gr x 8 P.M.			awakened + Short pain in region of wound lasting ½ hr. Slept
20	4	3 III		Rochelle Salts ℥j in vichy q 15.30 2 3 P.M.	S.S. Enema 8 x n for gas	Beef Tea 5 milk	Soundly from 2.30 to 6 a.m.
	12.30	D III		1 qt 10.30 P.M.			Pt has had a very
	6	3 IX		Veronal gr x 8 P.M.		Egg nog 8 P.M.	Comfortable day
21	6	3 IV			S.S. Enema 8 x n for gas	Beef Tea Egg nog toast junket	Awakened at 2.30 a.m. with severe pain in side was quite restless until 4.30 a.m. Pt appears. Considerable amount of gas. Stool large semi-formed. Slept
	8.30	3 I	÷				Soundly from 12.30 until 1.30 P.M.
	1.30	2	÷	Veronal gr x 8 P.M.		C.D.	Comfortable day
	8.30	3 VIII					Dressed by D. Parker
22	9	3 XI			S.S. Enema 8 x n for gas	C.D.	Slept well during the night.
	4.30	3	÷	Syr. White Pine 7 ℥ q.4.h.			worked twice both only for a short time. Pt slept soundly
	2	3 IV					from 2.15 to 4 P.M. Complains of
	8.30	3 VIII		Sod. Bicarb gr xx 8 P.M.			dry cough but has had a very restful day
23	6	3 VI		Syr. White Pine 7 ℥ q.4.h. 2-4-6 a.m. 2-4-6-10 P.M.	S.S. Enema 8 x n for gas	C.D.	Pt slept well during the night.
	8.30	3 X		Calomel gr ½ q ½ h and 6 doses			Pt has had a very Comfortable day
	12	3 VI					
	8	3 I	÷				

FIG. 11.—Bedside notes of nurses, compacted as much as possible.

CROSS REFERENCE SHEET

BROOKLYN HOSPITAL

CROSS REFERENCES

Name of Complicating Disease ..... *from* 19

to 19

NAMES OF DISEASES COMPLICATED	HISTORY NUMBERS OF THE DISEASES NAMED BELOW

FIG. 12.—In the front of each bound volume this sheet stands so that any case can be found by way of complications, or complications can be listed.

COMPLICATION SHEET

BROOKLYN HOSPITAL

COMPLICATIONS OF

..... *from* 19

to 19

NAME OF COMPLICATION	HISTORY NUMBERS OF THE DISEASE NAMED ABOVE

FIG. 13.—This sheet also stands at the beginning of each division of the nomenclature while the cases are waiting in the drawers to be bound, or after binding, as the first pages of the volume.

the office. In dismissing accident cases, a full statement of the conditions on final examination is required, over the signature of the member of the Visiting Staff or House Staff making such examination. The back of the sheet is to be used where the front does not furnish sufficient space under any given heading.

5. *Admission History.* Histories on the medical service shall be taken on the lines of the syllabus provided. General surgical histories shall follow the order of the surgical syllabus. Gynecological admission histories of any service shall be entered on the special form *gynecology.* Obstetric histories shall be taken on the blanks provided therefor. The history on admission shall be filled out, in the folder, within twenty-four hours of admission, whenever possible. Outlines whereon injuries or tumors or the like may be plotted will be pasted on the back of this sheet.

6. In private gynecological and genito-urinary cases, in which the history has been already taken by a member of the Visiting Staff, only the general items at the top of the history on admission, such as address, age, sex, etc., should be entered, but the following note shall be made on the record: "Private case; history taken by Dr. ....." In other private cases the history will be taken, unless otherwise directed by the Visiting. A private case, although in charge of a member of the Visiting Staff connected with a different service, shall be entered on the history blank of the service to which the case properly belongs. Thus, a breast amputation, whoever the operator, is classed as general surgery, and any private obstetric patient is classed as of the obstetric service and the history is entered on the appropriate blank.

7. *Exceptions.* Surgery of the pelvis and eye, ear, nose, or throat, or orthopedic cases which are referred by the surgical staff of the First and Second Surgical services should be entered as general surgery and histories kept accordingly, but the gynecological admission history may be used for female

pelvic cases. In filing, care will be observed to index these properly. In order to favor a more equitable division of surgical work between the two House Surgeons, all general and special surgery sent in by members of the Visiting Staff not belonging to the First and Gynecological services shall go to the Second Surgical service.

8. Endeavor shall be made by the interne filling out the admission history, to ascertain the name of the physician who has referred the patient to the hospital or to the service of a member of the Professional Staff (except in private room cases), or who sent for the ambulance, or that of the family physician, and such name shall be entered on the history. In case of a common name (*e. g.*, Dr. Smith), initials or address should be added.

9. *Temperature Sheet* (see also under Nurses' Directions). The entries under "urine" and "blood" will be made at the earliest convenient time by the Pathologist. Whenever more space is needed by the Pathologist, the back of the temperature sheet may be used, with a reference note on the front; but important final reports, as of sections and autopsy, belong on the front page. Reports on sputum, stomach contents, feces, and bacteriological returns will be made on the back of the temperature sheet.

10. *Operation.* The folder carrying the history shall accompany the patient into the operating room and return to the ward or room with the patient. The House Surgeon or Acting House Surgeon shall make entry, or cause entry to be made (in the operating room as soon as possible after each operation or examination), of a synopsis of the operation or findings, or both together, with the name of the operator and a memorandum of drains or packs or stitches to be removed, and shall append his signature. If the most important facts are entered, gaps may be left for filling in details later. Operation sheets delayed or not filled out in time to return with the rest of the history to the ward will be for-

warded by the Operating Room Nurse by 4 P.M. The record of anesthesia made by or under supervision of the Anesthetist is to be entered directly on the operation blank soon after the operation.

11. *Continued History.* Here all important matters in the patient's condition after admission or operation which are not covered in other blanks shall be summarized always, and, where necessary, related in full. Such items as important changes in conditions or suppuration must be entered at once, but a synopsis of the nurse's bedside notes may be required not oftener than once a week. The House Surgeon and House Physician will be held responsible for a continued history that gives, in a brief form, all important events.

12. Care must be exercised that the diagnosis on the front sheet is full and exact. On dismissal of all except obstetric patients the history accompanies the patient to the office, and is filed in the history case under service headings or guides until signed by the Visiting. The pages are then placed in the following order; Front; admission history (or gynecology); operation, if any; continued history; temperature chart; bedside notes. Any missing form must be reported to the Committee or Historian at once by the office. Any late report from the Pathologist will be entered on the front sheet in the office. The Visiting Staff will sign histories here also.

13. The second and fourth weeks of the month are "signature weeks," and any member of the Visiting Staff will find, in the history case in the office, the histories grouped under his name or his service, and will sign the same. Inasmuch as good histories are only to be obtained by personal attention of the head of each service, in case of failure to inspect and sign histories on the part of a member of the Visiting Staff, the Committee will call the member's attention to the omission, and, on expiration of a reasonable time, report such omission to the Professional Staff.

14. No history or part of a history nor any part of the index may be taken from the building except by written order from the Superintendent or the representative of the Superintendent. Such order shall be filed in a place indicated by the Superintendent. Access to the histories after completion shall be had only by the Superintendent's office, the Visiting Staff, the Historian, the House Staff, and the Dispensary Staff. Histories shall be kept in folders in vertical files in the office until bound.

15. Supplies will be kept in the storeroom, but small quantities will be on hand in the wards or in the rooms of the House Staff in convenient places designated by the committee. Special printed forms will be furnished by the hospital whenever a large number of histories cover the same limited field, as in the Obstetrical and Gynecological services, but the cost of special blanks to collect observations for researches by members of the staff must be met by the member making such research. Such histories or portions of histories shall constitute part of the hospital record, and may not be removed.

16. The index of names will be kept in the office by the office force except as above specified. An index of operations will be kept by the Historian, conforming to that in the *London Nomenclature*. On the "complication" sheet and the cross-reference sheet the Historian shall record each complication and disease as the committee shall direct. The histories will be bound as they are filed in the order of the *Bellevue Nomenclature*—that is, by diseases.

The Committee on Histories of the Professional Staff for the current year is Dr. Dickinson; Substitute, Dr. Jennings; Historian, Dr. Pier; Associate Historian, Dr. Moore.

NURSES' DIRECTIONS CONCERNING HISTORIES.

The outside cover of a history is called a folder. The upright cardboard bearing label of service is called a guide.

Entries will be made in ink. The last name of a patient is to be written last, thus "John Smith," and Miss or Mrs. precedes Christian name.

The folders containing histories shall be grouped together in a suitable place in the wards and on the Private Side. Each folder is to contain, in this order, the following blanks: Temperature Chart; Bedside Notes, in regular sequence, turning over like pages in a book; Front; History Admission (or Gynecology); Operation (if any); Continued History.

The history blanks are to be assembled in proper sequence by the nurse in charge on admission of the patient to the ward or room. The admission number is to be entered on the history by the nurse in charge. The admission slip bearing the admission number and the patient's name and designating the service will hang at the patient's bed until the bedside card replaces it.

The following are the blanks in use. Each is designated by a name in its left upper corner:

Front. This is filled out by members of the Attending Staff or House Staff when any of the facts called for are developed, but is not put in its position until the patient is discharged.

History Admission. The plain history blank is used for all cases but obstetrical and gynecological, when the special blanks for such histories are to be substituted; all entries are made by the Staff.

Operation. Anesthetist and House Surgeon make the entries.

Temperature Chart. To convert the b. i. d. temperature into a q. 4 h. temperature write, covering or just below "M" or "E," the hour, thus, "4, 8, 12, 4, 8, 12." This permits unbroken records, when a change is made from one method to the other. A red line is drawn after midnight of each day whenever the q. 4 h. method is employed. One day at a time is usually enough to fill out. All temperatures

are to be b. i. d. unless otherwise ordered, excepting that major operations shall have q. 4 h. temperatures for four days after operation.

Under the heading "Day in Hospital," designate any part of a day as the first day. Under the heading "Day of Disease," designate any part of a day as the first day; Day "after Operation," designate the day of the operation as first day.

Bedside Notes. Admission temperature is to be entered. No lines should be wasted. The bedside notes and the chart of temperature are the province of the nurse, and entries should not be made by others.

Continued History. For a synopsis of the after-care or for memoranda by Visiting Staff or House Staff.

The history accompanies the patient to the operating room, and to the office on dismissal.

ENDOMETRITIS EXFOLIATIVA—DYSMENORRHEA MEMBRANACEA.

By Hugo Ehrenfest, M.D.,
St. Louis.

The recent investigations of Loefquist,[1] Theilhaber,[2] Schwab,[3] Hartje,[4] Schick,[5] and especially the various contributions of Hitschmann and Adler,[6] [7] [8] are speedily leading to radical changes in the common views concerning the pathology of endometritis and the histology of menstruation. Hitschmann and Adler have established the striking fact that those well-known histological pictures which heretofore have been regarded as characteristic of either endometritis glandularis or interstitialis are typically found in the normal and healthy endometrium during the various stages of the menstrual cycle.

These writers presented their first contribution at the twelfth meeting of the German Gynecological Society in Dresden. A brief abstract of their paper, which shortly afterward appeared in the *Centralblatt f. Gynäkologie* (June 29, 1907), conveyed such a clear idea of their important findings that the thought at once suggested itself to me that this new knowledge of the histology of the menstruating endometrium probably will solve the much mooted question of the etiology and pathology of dysmenorrhea membranacea.

My investigations were practically concluded and the sketch for this paper almost finished when I found Hitschmann and Adler's latest publication in the February, 1908,

number of the *Monatsschrift f. Geburtshilfe und Gynäkologie*, entitled "Dysmenorrhea Membranacea." I wish to state here that my own findings and deductions in all essential points confirm their views; some differences will be pointed out later.

It has been my intention to show in this paper, from the extensive literature on the subject, how we are at present forced to return to the antiquated conception of a partial exfoliation of the endometrium during menstruation. This also has been done in a most convincing manner by Hitschmann and Adler in this recent paper. It is well known that this theory of a partial destruction of the uterine mucosa during menstruation was placed on a sound scientific foundation by the classic work of Kundrat and Engelmann. Gradually, however, it has been discredited by the writings of other investigators, especially by Gebhard. The description of the menstruating endometrium, as given by Gebhard, today is found in every text-book of gynecology, but beyond any doubt it is faulty in its most important points.

This paper is based upon the histological examination of eight membranes obtained from three patients.

The first membrane is from a patient, married seven years, who was sterile. She menstruated very regularly. Once she went over time eight days. Her flow started and continued scantily for five days, then became more profuse for another six days. She suddenly had crampy pains, and on the next day found on her napkin a little membrane. A section showed an endometrium of approximately normal thickness, with typical subepithelial hemorrhages and occasional decidual-like cells.

The differential diagnosis between an exfoliated menstruating endometrium and a very young decidua in this particular case was of extreme practical importance, because both the patient and her husband were unusually anxious to have a child and at that time were seriously thinking

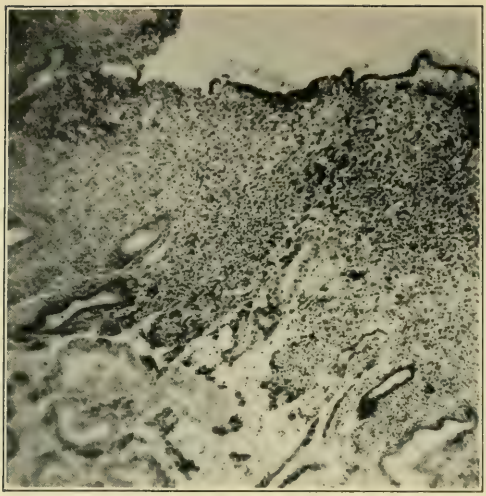


Fig. 1.—The mucosa is divided into a superficial compact and a deeper spongious layer. While in the superficial layer the glands stand farther apart than in the normal endometrium, in the deeper layer the glands are dilated and the amount of interglandular tissue reduced. (Enlargement 50.)

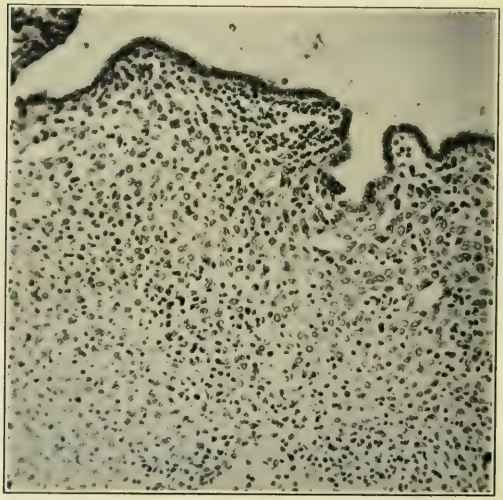


Fig. 2.—The superficial layer of the menstruating endometrium contains numerous typical decidua cells which often are grouped around the capillaries. The surface epithelium is well preserved. (Enlargement 125.)

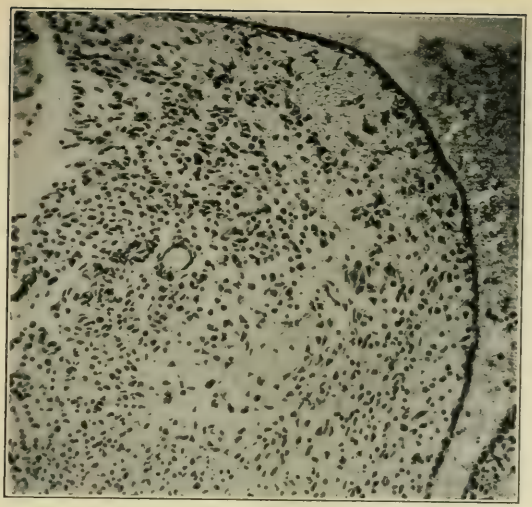


FIG. 3.—Extravasated red blood-cells and mono- and polynuclear lymphocytes, together with the decidual reaction of a large number of connective-tissue cells, in the upper stratum of the menstruating endometrium increase the amount of interglandular tissue. The surface epithelium is well preserved. (Enlargement 125.)

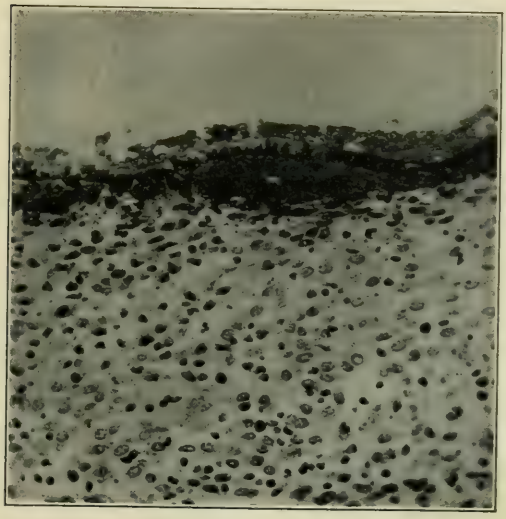


FIG. 4.—The surface epithelium, which in general is present to the greatest extent in all sections of all membranes, at times is detached from the underlying tissue by a narrow band which consists of red blood-cells, in other places of some tissue in hyaline degeneration. (Enlargement 150.)

of adopting one. Fetal tissue, in spite of very careful search, was not found in any of the sections. The opinions of various men who saw the sections were divided. Some considered it a menstrual membrane, others and I myself a true, very young decidua. A section was sent to my friend Dozent J. Pick, of Berlin, who declined to make a positive diagnosis, but favored the idea of an early abortion. About a year later this patient became pregnant, and since has given birth to a child. This, in my belief, confirms the diagnosis of true decidua.

The second membrane was obtained from a woman, also married seven years, who was sterile and very anxious to have a child. It may be stated that this patient was an intimate friend of the patient mentioned in the preceding history. For the last five years her menstruation was rather irregular, often being delayed from two to four weeks. After such delay the next menstruation usually would be of the regular type, rather scanty, lasting three to four days, never accompanied by any pain. About five months after her marriage she was affected with what her physician at that time called "abscess of the womb." I could find no plausible cause for the sterility on examination, although some difficulty was experienced in passing a uterine sound through the internal os. Eighteen months later this patient brought a membrane to my office with the following history: Of late menstruation had been rather regular. Only last time she went ten days over the time. She had some crampy pain, then the flow started, and a few hours later she found the little membrane. She had looked for it, being well acquainted with the experience of her friend.

Although in this case the clinical picture spoke less in favor of an abortion than in the first mentioned case, the microscopic examination of the discharged membrane left no doubt concerning the diagnosis. No fetal elements were found, but the membrane showed in all portions a

complete transformation of the stroma cells into typical decidua cells. In the compact layer the glands had almost disappeared.

The six other membranes were obtained from a woman thirty-seven years old, who undoubtedly was suffering from a dysmenorrhea membranacea, although clinically her case was not exactly typical.

She was married twenty years, and to her knowledge, pregnant twelve times. Four times she carried to full term, the last seven years ago. Eight pregnancies ended prematurely, the last six years ago in the third month, with the expulsion of twins. She was menstruating very regularly, every four weeks. Her flow varied greatly in intensity, but she never had the slightest pain or even discomfort during menstruation. According to her statement, she realized that she was menstruating only by the fact that she "felt wet."

Incidentally, she informed me at the time of the first consultation that for the last several years she has observed that a "skin-like" structure is expelled with the menstrual flow, whenever she had even only one cohabitation during the preceding month. This membrane, in her belief, is an aborted ovum, which passes without any pain usually on the second day of menstruation, accompanied by a little larger amount of blood. It may be stated here that the immediate cause of her consultation was a cystitis, undoubtedly due to a gonorrhea, acquired from her husband about a year ago. The fact that she is passing these membranes was only accidentally ascertained while taking the history.

Gynecological examination yields the following results: Perineum in very good condition. Posterior vaginal wall slightly relaxed and descended. Cervix large, slightly lacerated, external os gaping. Uterine body of normal size, in freely movable anteversion. Both uterine appendages apparently normal. There is no tenderness except on pressure against the trigonum.

The first membrane brought by the patient was examined for diagnostical purposes. The microscope showed conclusively that it was not a decidua, since it exhibited the picture of an interstitial endometritis, and at that time a diagnosis of endometritis exfoliativa was made.

For experimental purposes the patient next was instructed to refrain from cohabitation, which was easily accomplished, because at that time her husband had taken a position out of town. Membranes continued to pass, and the fact was established beyond any possible doubt that the expulsion of these membranes positively was independent of coition or the possibility of impregnation. These membranes were expelled at almost every menstruation, and five of them were subjected to a careful examination for the purpose of comparing them with the description given by Hitschmann and Adler of the normal endometrium during menstruation.

The findings were practically identical in all membranes, and can be briefly described as follows: The superficial epithelium is in almost all sections of all membranes preserved to the greatest extent. As a rule, it is cylindrical, with the nucleus in the middle of the cell, as is characteristic of the endometrium. In some sections it is more cuboidal. A subepithelial hematoma showing the erythrocytes plainly in a state of degeneration in many sections is visible as a long, narrow band of almost uniform width, which detaches the surface epithelium often for a long distance. Wherever the epithelium is thus detached, the contours of its cells are indistinct, the epithelium apparently being in the state of a beginning necrosis. The subepithelial hematoma is missing in many sections. In the superficial portions of the endometrium the decidual changes are well-marked in many of the stroma cells. Especially around the greatly enlarged vessels, clusters of these typical epithelioid cells can be seen. A zone of protoplasm surrounds the large nucleus, which takes the stain poorly.

The stroma contains a large amount of extravasated erythrocytes and of mononuclear and polynuclear lymphocytes. In the superficial portions of these membranes the glands are narrow, rather straight, and stand farther apart from each other than in the normal non-menstruating endometrium. Distinctly different is the histological picture of the deeper portions, which, however, are preserved and visible only in some sections. Here the lumen of the irregularly shaped, indented glands is greatly widened. The glands are lying nearer to each other, the interglandular tissue being distinctly lessened. Decidua-like cells are extremely rare in this portion of the membrane. In many sections blood is seen to adhere to the ragged, uneven edge of the membrane where it has become detached.

If we compare these findings with the description and splendid illustrations presented by Hitschmann and Adler in their paper, "Structure of the Endometrium in the Mature Woman, Especially during Menstruation,"[7] we cannot fail to recognize that they are practically identical with those representing the endometrium just before menstruation. These two writers have conclusively shown that at that time the increased size of the glands in the deeper layers of the endometrium produces that picture which has been considered characteristic of endometritis glandularis hypertrophica. In the more superficial layers, on the other hand, the amount of interglandular tissue is greatly increased as the result of both the decidual changes in a large number of stroma cells and of the extravasation of erythrocytes and lymphocytes. The glands themselves are compressed and pushed farther apart. Thus, the picture of an endometritis interstitialis is produced in the more superficial portion of the endometrium. Or, in other words, the endometrium during menstruation, like a true decidua, is composed of a compact and a spongy layer. In all five membranes these two strata are distinctly differentiated, wherever a portion

of the spongy layer, within which the detachment occurs, was preserved.

Interesting in my case is the extensive preservation of the surface epithelium in almost all the membranes. Hitschmann and Adler state that they have never found the surface epithelium in any of the many membranes examined by them. As stated above, the epithelium in my sections often was seen detached for some distance by a long ribbon-like hematoma, and in these instances the epithelium showed signs of a beginning necrosis. There is no doubt that my membranes then represent a somewhat earlier stage of menstruation. It can be assumed that if the detachment of the membrane had occurred possibly only twenty-four hours later the epithelium would have been lost. And this point brings up the last question to be considered, namely, the cause of the exfoliation and extrusion of these membranes.

The idea that this process is the result of acute or chronic inflammation is untenable in the light of the findings of all recent investigators. An endometritis exfoliativa which leads to the expulsion of the endometrium during menstruation does not exist. It has been shown in my case that, exactly as in those of Hitschmann and Adler, the dysmenorrheic membrane exhibits the characteristic picture of the menstruating endometrium. On the other hand, satisfactory proof has been furnished of late that during menstruation at least a portion of the uterine mucosa is exfoliated. We thus seem forced to the conclusion that the expulsion of the whole endometrium during menstruation is not a pathological, but only the exaggeration of a normal physiological process.

Hitschmann and Adler[3] assert that the underlying cause for a very extensive or complete exfoliation of the uterine mucosa is found in the differentiation of the endometrium during menstruation into a compact and a spongy layer. This explanation seems acceptable. The formation of the spongy layer certainly loosens the normal attachment of the mucosa.

The term, "exaggeration of the normal physiological process" then refers, first of all, to an unusually marked development of a spongy stratum during menstruation. This could be the result of structural variations of the endometrium which still lie within physiological limits or may be the expression of an abnormally strong reaction of the endometrium to the chemical impulse sent out by the ovaries, according to that interesting theory evolved by Halban[9] concerning the internal secretion of the ovaries.

There remains then to be explained the immediate cause of the detachment. Hitschmann and Adler do it in the following way: If a small clot of blood or fibrin blocks an even normally wide internal os and prevents the free escape of the menstrual blood, the uterus will respond with contractions. The stronger these contractions are and the better pronounced the differentiation of the endometrium into these two layers is the more likely is the detachment.

In this explanation of Hitschmann and Adler strong uterine contractions form the essential factor in the process of exfoliation, and it is obvious that they consider the mechanism of the separation of the endometrium practically identical with that which leads to the detachment of the placenta postpartum.

This analogy, in my opinion, does not exist. The placenta becomes detached after the expulsion of the fetus because the area of its attachment to the uterus suddenly is reduced to a fraction of its former size. Such a disproportion of surface between endometrium and uterine wall certainly does not develop during a contraction of the small menstruating uterus.

Hitschmann and Adler's theory, furthermore, does not seem applicable to the not uncommon cases in which, as in mine, the endometrium is exfoliated without any pain. It seems inconceivable that strong uterine contractions could occur without causing the slightest discomfort.

Against this theory, finally, speaks the disappointing but

common experience that, as a rule, the usual treatment of dysmenorrhea membranacea, consisting in wide dilatation of the cervix and curettement, leaves the condition practically unchanged.

In my opinion, the immediate cause of the detachment, like the already mentioned underlying cause, is found in the structural peculiarities of the menstruating endometrium.

In the spongy layer of some of the membranes examined by me the interglandular septa often are extremely thin; indeed, here and there the basis of the epithelial lining of one gland almost directly touches the lining of an adjoining gland. These thin septa, which effect only a loose connection of the endometrium with the uterine wall, in my belief under certain conditions may be extensively destroyed either by excessive compression or by an interstitial hemorrhage, often probably by both processes. The compression of the gland ducts in the superficial layer of the endometrium during menstruation produces a retention of secretion in the cecal ends of the glands. It is this process which leads to the differentiation of a spongy layer during menstruation. The greatly distended glands of the deeper layer press against the interglandular septa, and I assume that an excessive pressure exerted in this way occasionally may result in the degeneration or necrosis of such septa. If during this process bloodvessels are destroyed, a hemorrhage will occur and, obviously, the escaping blood will develop into a submucous hematoma by following the path of least resistance along the spongy stratum. The idea of a submucous hematoma as the immediate cause of the detachment of dysmenorrheic membrane is not new; thus, Gottschalk[10] spoke of a thrombosis of endometrial vessels. Such a theory finds further support in the histological findings. In describing my sections, I have mentioned the fact that often blood is found firmly adherent to the fragments of the spongy layer seen in some of these sections.

If these detached membranes are small or the cervical

canal wide, they probably are carried away with the escaping blood and pass unnoticed. Only if there is a disproportion between the size of the membrane and the internal os of the cervical canal, painful uterine contractions become necessary for its expulsion, and we then have the typical clinical picture of a dysmenorrhea membranacea.

The deductions which can be drawn from these investigations may briefly be summarized as follows: Membranes expelled during menstruation in cases of so-called dysmenorrhea membranacea show the typical histological picture of the normal endometrium during menstruation. They resemble so closely very young true decidua that at times a positive differential diagnosis becomes impossible. The exfoliation of these membranes is not the result of an inflammatory process, but is due to an exaggeration of certain normal and physiological changes in the menstruating uterine mucosa. At this time the endometrium is divided into two distinct layers, a compact and a spongy stratum. This differentiation is the essential factor in the process of exfoliation. The actual detachment is probably effected by degenerative processes or hemorrhages which destroy the thin interglandular septa of the spongy layer. If the internal os of the cervical canal is too small to permit the unhindered passage of the detached membranes, they are expelled by strong and painful uterine contractions.

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10. Gottschalk. Deutsch. med. Woch., 1903, No. 48.

AN EXPERIMENTAL STUDY ON HEMORRHAGE FOLLOWING SECTION OF THE UTERINE AND OVARIAN VESSELS IN DOGS, AND ITS POSSIBLE BEARING ON RUPTURED ECTOPIC PREGNANCIES.

By Hunter Robb, M.D.,
Cleveland.

Physiologists have estimated the total quantity of blood in the human body at about 7.7 per cent. of the body weight. Thus, a woman weighing 130 pounds would have a blood content of about ten pounds.

Now, "just what percentage of loss"—to quote from Howell—"can be borne by the human being has not been determined, but it is probable that a healthy individual may recover without serious difficulty from the loss of a quantity of blood amounting to as much as 3 per cent. of the body weight." This in a woman of 130 pounds would be a loss of four pounds, or approximately 1650 c.c. We question whether so large an amount, or, at any rate, much more blood, is found in the average patient of the above weight as a result of the hemorrhage resulting from a ruptured ectopic gestation.

During the past nineteen months we have been conducting a series of experiments on dogs to see if it might not be possible to throw some light on this phase of the subject from the standpoint of hemorrhage.

These experiments, so far as we have gone (thirty-one

experiments), seem to show that in dogs at least hemorrhage from large internal vessels ceases before it is sufficient to prove fatal. No dog succumbed to the hemorrhage following excision of the ovary, division of the broad ligament with section of the left uterine vessels, section of the uterine vessels on both sides, and other lesions. In none of these cases did the dog succumb to the hemorrhage, although we probably subjected our animals to as great a risk of bleeding to death as is incurred by the average woman suffering from a ruptured tubal pregnancy.

Before taking up in some detail the findings in our experimental work, I would like to briefly recall to your memory the anatomy of the parts. In the bitch the uterus consists of the body or corpus and its two long horns or oviducts; in the latter, fetal development takes place. The oviducts are connected anteriorly with the very short, slender Fallopian tubes; the outer ends of the latter lie very near the ovaries, which are situated posterior and dorsal to the kidneys. Each uterine artery is a branch of the pudic, the latter being one of the two main divisions of the internal iliac; they are vessels of considerable size, even as compared with the corresponding arteries in women. The ovarian vessels, on the other hand, are quite small (Plates I and II).

With these anatomical differences in mind, a *résumé* of the cases is herewith presented.

The experiments carried out may be divided into the following series:

1. Division of the uterine and ovarian vessels.
2. Division of the uterine vessels producing shock. Secondary operation on dog while in a condition of shock.
3. Division of the uterine vessels and observations on the blood pressure and hemoglobin.
4. Division of the uterine vessels and observation on the pulse, respiration, and hemoglobin, with special reference to the time of the clotting of the blood.

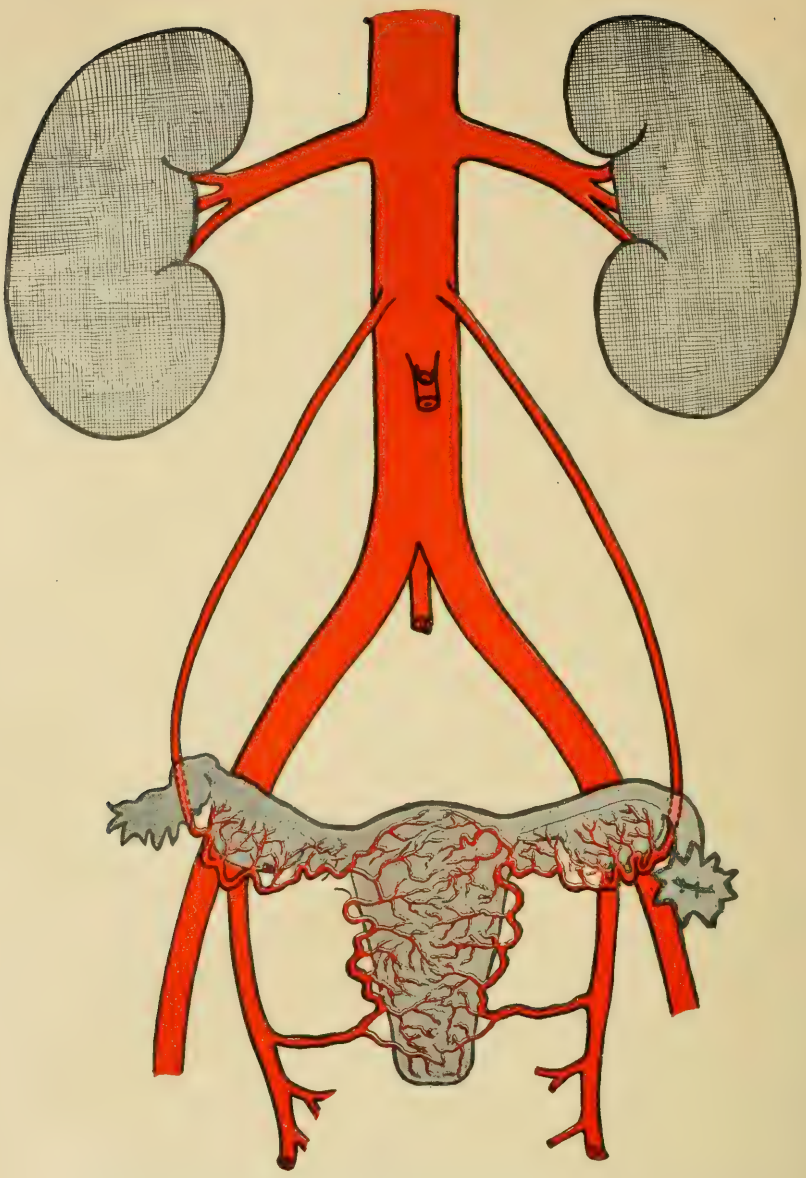

DIAGRAM OF THE DISTRIBUTION OF UTERINE AND OVARIAN ARTERIES IN THE HUMAN SUBJECT.

The diagrams afford a comparison between the uterine artery in the human being and that in the dog. Plate I, which shows the artery in the human subject, is a composite picture of the diagrams in Corning's and Gray's *Anatomies*. Plate II, which snows tne distribution of the uterine and ovarian arteries in the dog, was made after injecting the bloodvessels. It will be seen that in the human being, at the points at which the uterine comes off from the anterior branch of the internal iliac, there is a much sharper angle than in the dog. In order to snow the course of the uterine artery in the dog the uterus with the oviducts was placed over the symphysis pubis.

PLATE II

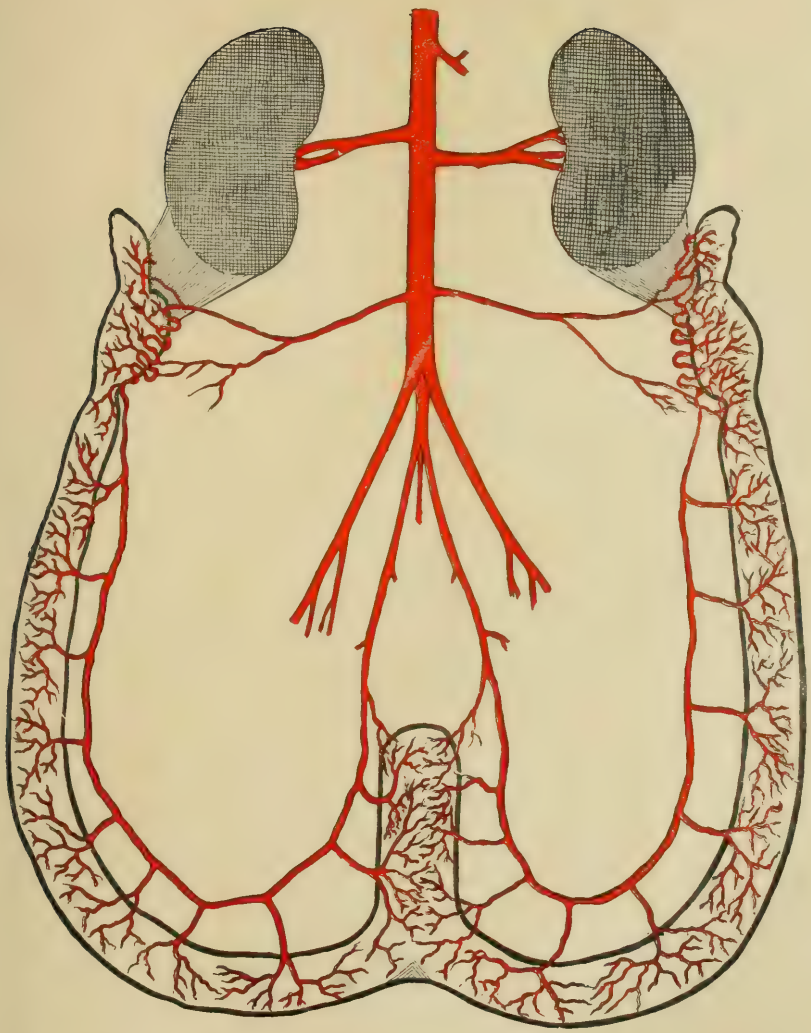

Diagram of the Distribution of Uterine and Ovarian Arteries in the Dog.

5. Division of the vessels, observations on the pulse, respiration and hemoglobin before and after bandaging, and before and after applying weights to the lower abdomen.

6. Division of the uterine vessels with the dog in the upright position; observations on the pulse, respiration, and hemoglobin.

Experiments.

Series 1. *Division of the Uterine and Ovarian Vessels.*

In this series we have carried out excision of the ovary, division of the broad ligament, with section of the left uterine vessels, section of the uterine vessels on both sides and other lesions. In none of these cases did the dog succumb to the hemorrhage.

Dog No. 1. Well nourished. Weight, 6.5 kilos.

January 11, 1907. Ether anesthesia. The abdomen was opened through a median incision 6 to 7 cm. long. Pelvic organs apparently normal. The outer end of the right oviduct was cut through, and the right ovary excised. There was no free bleeding at the site of the injury. The incision was closed in layers. There was but little variation in the pulse throughout the operation. Quick recovery from ether and an uneventful convalescence.

Dog No. 2. Well nourished. Weight, about 12 kilos.

January 25, 1907. Ether anesthesia. Median incision 4 cm. long. Pelvic organs apparently normal. The right broad ligament was cut through its entire extent, the uterine vessels being severed. There was active arterial hemorrhage, the blood welling up into the abdominal wound. Incision quickly closed in layers. At the end of the operation the mucous membranes showed a distinct blanching. Pulse 140, of small size. Dog conscious thirty minutes after being put to bed. A good deal of vomiting during first six hours.

26*th.* Dog is up and walking about, showing no signs of pain. This dog escaped from her cage several days later. She had made a good recovery, so far as we could judge.

Dog No. 3. Good condition. Weight, about 10 kilos. "In heat."

January 30. Ether anesthesia. Median incision 4 cm. long. Pelvic organ congested. Outer end of left oviduct cut through and left ovary excised. The left uterine vessels were now cut across. Free bleeding from the latter and also from the ovarian. Incision quickly closed in layers. At the end of the operation pulse of rather small volume; rate not obtained. Dog conscious soon afterward.

February 2. Condition good. Dog disposed to remain quiet.

6*th.* Dog bright and active, taking her food well.

Dog No. 4. Well nourished. Weight, about 10 kilos.

February 2. Ether anesthesia. Median incision 4 cm. long. Pelvic organs normal. The uterine vessels on both sides were cut across. Very free bleeding. Incision quickly closed in layers. Pulse rapid, but of fairly good volume. Dog conscious before leaving the table. Given morphine, 1 grain, hypodermically at once. Thirty minutes later dog was standing and drinking water greedily.

6*th.* Dog suffered apparently but little from operation. Today seems bright, but is not disposed to move about much.

16*th.* Dog made an uninterrupted recovery.

Dog No. 5. In good condition. Weight, about 10 kilos. Normal pelvic organs. The left ovary was excised, and the uterine vessels on both sides were cut. There was the usual free hemorrhage. Immediate closure in layers. Dog conscious on reaching bed. Pulse not very rapid and of good volume. Seen thirty minutes later dog had changed position, but was then perfectly quiet.

February 9. Dog had been doing well. Yesterday was eating. Today does not appear so bright. Does not object to being moved. Pulse and temperature normal.

16*th*. Rapid improvement since last note. Dog is now active.

Dog No. 6. This is the same animal used in Experiment No. 1 (q. v.).

February 9. Dog had made a complete recovery from first operation. Ether anesthesia. Abdomen reopened through former incision. No free fluid or clotted blood found in peritoneal cavity. A few delicate adhesions about the pelvic structures. The right oviduct was enlarged and bent upon itself. In the left oviduct were two fusiform swellings, the one about 1.5 cm. from the corpus uteri, the size of a pigeon's egg, the other in the outer half of the oviduct almost as large as a duck's egg, apparently filled with clear fluid. The uterus and oviducts were now removed in toto by one continuous cut of the scissors from side to side. Bleeding was profuse. Immediate closure in layers. At end of operation pulse was hard to obtain; respirations shallow. Dog able to open her eyes. Seen fifteen minutes later, dog was standing on all-fours lapping water.

16*th*. Dog did not appear to be suffering from operation. A few hours afterward was walking about in her cage. No sedative was given. At present seems to be in good condition.

25*th*. Dog has apparently made her second complete recovery. Incision well healed.

Dog No. 7. Same animal as No. 3 (q. v.). (The first operation had been made seventeen days before. The left ovarian and uterine vessels were out.) Dog has made a complete recovery. Now bright and lively.

February 16. Ether anesthesia. Abdomen was reopened through the former incision. No blood found in peritoneal cavity. A few light omental adhesions. No pulsation could be detected in the stump of the left uterine artery, nor was there any clot around it. The right uterine vessels were now cut, and a temporary closure of the abdominal cavity was made by placing clamps on the edges of the divided perito-

neum. At the beginning of the operation the pulse rate was 128. The dog was now kept under a light anesthesia. Fifty minutes after cutting of vessels the pulse began to show an increased rate, being at this time 136. A steady rise continued during the next thirty minutes, at the end of which time the rate was 156. The clamps were now removed from the peritoneum, and the blood found in the pelvis was carefully removed with gauze sponges. After gentle application with a gauze sponge at the cut end of the artery, cessation of the bleeding resulted at the end of about ten minutes. Twenty minutes later a subcutaneous infusion of salt solution (400 c.c.) was given. This was nearly all taken up in thirty minutes. It was given to see if the subsequent rise in the blood pressure would bring on a recurrence of hemorrhage from the uterine artery. No such effect was produced at the end of thirty minutes after the absorption of the saline solution. Gentle squeezing of the end of the vessel, however, was sufficient to expel the clot which had formed, and fresh bleeding began. The experiment was brought to a close at this point, the uterine artery ligated, and the incision closed in layers at once. The pulse rate at the end of three and one-half hours consumed in the observation was 144.

February 25. Dog has done well from day of operation. Is now as active as ever. The amount of blood lost during the experiment was estimated approximately and found to be 240 c.c.

Dog No. 8. Young bitch. Poorly nourished. Weight, about 4 kilos. Mucous membranes pale.

February 25. Median incision 6.5 cm. long. Uterus very small, the oviducts slender and cord-like structures. Evisceration of both ovaries, the uterus and oviducts in toto. There was very free bleeding from all the vessels. Immediate closure in layers. But slight change in pulse during operation. Fifteen minutes later dog appeared to be having a hard, shaking chill. Was conscious, but not able to hold up her head.

26*th.* Dog is bright, but moves about very little.

March 1. Dog appears to be gaining rapidly. Is now walking about her cage. Very anemic. Ether anesthesia. Abdomen reopened through previous incision. No free blood in peritoneal cavity. Omentum and intestines adherent in places to bladder, pelvic wall, and rectum; all easily separated. Around the stump of the uterus a small blood clot was adherent. No other clots present. Forcible manipulations of the stumps of the uterine vessels produced no active bleeding, only an oozing. Dog went into sudden collapse. Revived by artificial respiration.

Dog No. 9. In good condition. Weight, about 4.5 kilos.

February 26. Ether anesthesia. Median incision 6.5 cm. long. Total evisceration of intra-abdominal genitalia as in previous animal. Profuse hemorrhage. Immediate closure in layers. Mucous membranes became greatly blanched. At close of operation pulse rate was 180, shortly afterward becoming almost imperceptible. Soon after reaching bed dog was conscious, but made no attempt to move.

March 2. Dog is bright and fairly active. Mucous membranes quite pale. Ether anesthesia. Abdomen was reopened through the previous incision. No fluid or clotted blood present in peritoneal cavity. Stump of corpus uteri brought up and found surrounded by a small clot. No distinct pulsation to be made out in uterine vessels. Well-marked oozing, caused by active manipulations of pelvic structures, increased by freshening cut surfaces of previous operation. Closure in layers. Pulse rapid, but of good volume at end.

Dog No. 10. In excellent condition. Weight, 17.5 kilos.

March 15. Ether. Median incision. Uterus very small for so large an animal (has never been pregnant). Uterine vessels cut on both sides. Bleeding by no means so free as in previous cases. Closure in layers. Pulse good at close.

18*th.* Dog appears as well as before operation.

Dog No. 11. In fairly good condition. Weight, about 6 kilos. Considerable enlargement of both thyroids.

March 18. Ether. Median incision. Pelvic organs are normal. Uterine vessels of average size. Cut on both sides. Bleeding very free. Immediate closure. Pulse rapid, but of pretty good volume.

19*th*. Dog today is bright and playful. Abdomen was reopened under ether; 1 to 3 drams of bloody fluid present, and a small blood clot on each broad ligament at site of cut ends of uterine vessel. Removal of clot on right side brought on active arterial hemorrhage. Genital organs now excised in toto, the corpus uteri being cut across below level of previous division of uterine vessels. There was profuse bleeding, probably two ounces escaping from abdominal cavity before closure was made. At the end of operation the pulse was rapid and of small size. Mucous membranes greatly blanched. Dog able to hold up her head on reaching cage, but making no attempt to rise.

20*th*. This morning dog appears to have recovered well from yesterday's operation. She gets around well. While ether was being administered again dog ceased breathing, and all measures for resuscitation failed. About 6 c.c. of fluid and clotted blood found between bladder and intestines. Intestinal serosa pale.

Dog No. 12. Young bitch in fairly good condition. Weight, 5 kilos.

March 21. Ether. Median incision. Uterus quite small, but vessels of good size for age of dog. Right uterine vessels cut. Free arterial hemorrhage. Immediate closure. Pulse of good volume, not very rapid.

22*d*. Dog all right today. Ether. Abdomen reopened; 8 to 10 c.c. of bloody fluid and blood clots present. Left uterine vessels were cut and bled freely.

23*d*. Dog seems rather weak today, but is able to get around well. Abdomen reopened. About the same amount

of blood present as was found yesterday. Manipulation of uterus and broad ligaments caused fresh bleeding from the uterine vessels. Dog conscious at close.

26*th*. Dog somewhat dull today. Incision infected and gaping. Killed by forced anesthesia. Several cubic centimeters of purulent fluid found in pelvis. (Portion of femoral vein removed for study.)

Dog No. 13. In good condition. Weight, about 9 kilos.

March 25. The abdomen was opened in the median line. Each oviduct was occupied by four fetal sacs. It was estimated that the dog was about one-third along with her pregnancy, the period corresponding to the third month of gestation in the human being. The bloodvessels in the broad ligament were dilated, the uterine artery measuring 2 mm. in diameter at the junction of the oviduct and the body of the uterus. The right uterine vessels were incised at this point, the bleeding was profuse, and the abdomen was closed while the bleeding was going on. After the closure of the abdominal incision the femoral pulse could just be made out. The mucous membranes were very pale. Fifteen minutes later the dog lay stretched out with her eyes open and breathing quietly, but the femoral pulse could not be made out.

26*th*. The dog appears dull, but walks around without any difficulty. Pulse small, 140 to the minute. She was given a subcutaneous infusion of 200 c.c. of normal saline solution.

27*th*. Condition of dog good. Pulse 104, regular and of fairly good size. Abdomen was reopened and several cubic centimeters of bloody fluid and clots were found. The proximal ends of the cut uterine vessels were closed, but good pulsation was present in the artery. The fetal sacs of the left side were brought out and opened with longitudinal incisions, which were further torn apart with forceps. These tears were made from the dorsal sac inward on the inferior, the superior, the anterior, and the posterior surfaces of the

oviduct respectively. This procedure was followed by rather free bleeding from one torn sac. The abdomen was closed. One hour following the operation the dog was still prostrated, with a pulse 120, but of fairly good volume.

28*th.* Dog in excellent spirits and quite active. Abdomen reopened under ether narcosis. A small quantity of fluid and clotted blood was present. Good pulsations present in proximal stump of right uterine artery. Distal portions of the right vessels severed again and the fetal sac adjacent to the body of the uterus on this side torn apart. All the left sacs were again cut open in different places, and the left uterine vessels were severed. There was the usual free hemorrhage. Dog conscious on reaching bed; pulse very rapid and small.

April 2. Dog rather dull yesterday and today, but gets around well. Has shown no symptoms of pain. This morning the abdomen was reopened for the fourth time within a period of nine days. Several cubic centimeters of dark bloody fluid were present. Bladder much distended. Omentum adherent to fetal sacs. The left uterine vessels were thrombosed in their severed ends. Definite pulsation in the artery could not be made out on either side. The uterus and fetal sacs were now removed. Bleeding from the freshly cut uterine and ovarian vessels was very free. Abdomen closed. At the end of the operation the femoral pulse was 140 to 150, irregular and small. Mucous membranes much blanched. A tight binder was placed around the abdomen, and the dog was left in the Trendelenburg position. Three hours later the condition was about the same; 325 c.c. of a saline solution given subcutaneously, with slight improvement of the pulse.

3*d.* Twenty-four hours after the last operation the dog was found in much better condition, able to be on her feet, and taking nourishment readily. Pulse 120, regular, and of fairly good volume.

Dog No. 14. Small fox terrier bitch pup, black and white, with yellow face. Weight, 10 pounds.

February 10, 1908. 12.00 anesthetic started. Pulse 160. Two-inch median incision made. Right ovary, uterus, and oviducts excised. No ligatures placed. Wall incision closed in layers. Pulse at end of operation 140. Dog placed in pen.

5.00. Pulse 160. Dog drinking water this afternoon, and when taken out of pen walks back.

11*th.* Dog eating and apparently in good condition, but remains rather quiet.

13*th.* Dog sluggish, eats a little, drinks water, walks about a little, but seems to want to be quiet.

15*th.* Dog ate last night apparently as usual. Found dead this morning.

Autopsy. Wound looks clean, but has not united firmly. Under the incision there is a mass of clotted bloody fluid matting the bowels together, and uniting them to abdominal wall. No firm adhesions found here. There is some free dark bloody fluid in abdomen. (Smears taken later from this and stained, showed long coarse square-ended bacilli. Cultures on agar showed no growth.) The intestines are matted together in semisolid blood clots. The omentum is matted into a mass on the left side. Intestines clear. Liver, spleen, and pancreas appear normal. Heart and lungs normal. The uterine stump is covered with a firm blood clot and a few fine adhesions.

We have recently carried out two experiments to determine what effect would be produced by cutting the uterine veins alone. It has been said that the bleeding from a ruptured ectopic is for the most part venous in character, and will keep up indefinitely if the vein alone is injured. In neither of our experiments were we able to prove that such is the case, as in each instance, as will be seen by consulting the details of the experiments, the dogs recovered.

The two dogs experimented upon are Nos. 30 and 31, respectively, as the experiments were carried out recently, but they can best be introduced in this series of experiments.

Dog No. 30. *June* 6, 1908. Brindle bull bitch. Weight, 17 pounds.

11.15. Pulse, 128.

12.00. Anesthetic started.

12.15. Pulse, 180; respiration, 80; hemoglobin, 88.

12.17. Abdominal incision made.

12.20. Pulse, 160; respiration, 96; hemoglobin, 88.

12.21. Left uterine artery cut and tied. Right uterine veins cut, the artery being left intact.

12.25. Pulse, 168; respiration, 84.

12.30. Pulse, 160; respiration, 92.

12.38. Pulse, 180; respiration, 90; hemoglobin, 84.

12.45. Abdomen closed; sulphate of morphine, $\frac{1}{2}$ grain, given hypodermically.

12.55. Hemoglobin, 80.

1.00. Pulse, 108; respiration, 88.

1.45. Pulse, 104; respiration, 144; hemoglobin, 82.

June 7, 2 P.M. Dog active; running about so that bandages are completely off; wound left unprotected; hemoglobin, 82.

12*th*. Uneventful recovery.

23*d*. Perfectly recovered.

Dog No. 31. *June* 16, 1908. Long black-haired bitch. Weight, 16 pounds.

11.15. Anesthetic started.

11.30. Pulse, 180; respiration, 40; hemoglobin, 100.

11.35. Hemoglobin, 102.

11.37. Incision made.

11.40. Pulse, 132; respiration, 32.

11.46. Right uterine vein cut.

11.50. Pulse, 136; respiration, 28.

11.52. Left uterine vein cut; both arteries left intact and pulsating.

11.55. Pulse, 102; respiration, 20; hemoglobin, 95.

12.03. Abdomen closed.

12.10. Sulphate of morphine, 1 grain, hypodermically.

12.25. Hemoglobin, 94.

1.35. Pulse, 160; respiration, 20; hemoglobin, 94.

June 17. Dog active; eating.

23*d*. Uninterrupted recovery.

Résumé. In this series we have 16 observations.

I would like to call attention to the experiments carried out in Dogs Nos. 7 and 13, as they are of rather unusual interest.

In Dog No. 7, after cessation of the bleeding, we injected subcutaneously 400 c.c. of normal salt solution. This procedure seemed to exercise a general beneficial result, but brought about no recurrence of the hemorrhage. This observation would go toward refuting the view of Fritsch, who says: "To give subcutaneous saline infusions before the operation is wrong. I advise them directly after the operation."

Dog No. 13, who was about one-third along with her pregnancy, was operated upon four times within a period of nine days. At the first operation the right uterine vessels were incised. At the second operation (two days after first) the fetal sacs on the left side were opened by longitudinal incisions. At the third operation (day after second operation) the distal portions of the right uterine vessels were severed again, and the fetal sacs on the right side were torn open, the left sacs were again cut open in different places, and the left uterine vessels were severed. At the fourth operation (five days after the third operation) the uterus and the fetal sacs were removed. No vessels were tied or clamped at any of the operations. Twenty-four hours after the last operation the dog was able to be on her feet, and took nourishment readily.

Series 2. *Division of the Uterine Arteries Producing Shock. Secondary Operation on Dog while in a Condition of Shock.*

Dog No. 14. *February* 7. Black and white short-haired bitch, spotted black and white face. Weight, 26 pounds.

9.55. Anesthetic started.

10.25. Operation started. Pulse, 200; respiration, 88; three-inch median incision; oviducts and uterus very vascular; bladder distended.

10.45. Right uterine vessels cut; pulse, 204.

10.50. Apex beat of heart cannot be felt.

10.55. Apex beat of heart cannot be felt; mucous membranes paling; respiration, 140; anesthetic stopped.

10.56. Respiration, 72; Cheyne-Stokes type.

11.00. Apex beat not palpable; tongue and mucous membranes gray.

11.05. Apex beat not palpable; tongue and mucous membranes gray. Dog seems to be coming out from anesthetic.

11.10. Dog well out from anesthetic; tongue blanched; pulse not perceptible.

11.15. Apex beat feeble; pulse about 140; color of mucous membranes better.

11.20. Abdomen opened again; 3 ounces of bloody fluid sponged out; bladder tapped, emptied, and dropped back into cavity; the oviducts and incised vessel manipulated. The cut vessels were found oozing, but not markedly.

11.23. Apex beat feeble; respiration, 64 (good).

11.24. Apex beat feeble; respiration, 100.

11.25. Pulse taken at left uterine artery, 200 per minute.

11.30. Apex beat feeble; respiration good; mucous membranes improving in color.

11.40. Apex beat palpable, but rate cannot be counted; respiration, 32; apparently failing. Artificial respirations begun and continued until 11.55.

11.55. Dead. A fairly good-sized clot was found at point at which right uterine vessels had been severed.

Résumé. In this dog the right uterine vessels were severed and the abdomen was closed while the vessels were bleeding. After an interval of thirty-five minutes the dog's pulse was 204, and it fell to 140 before the abdomen was opened again.

On opening the abdomen the second time we manipulated the abdominal contents in very much the same manner as would be carried out in doing an operation for a ruptured ectopic pregnancy. The abdomen was then closed. In thirty-five minutes after this the dog expired, either from the effects of the operation or of the anesthetic, or from a combination of these factors. This experiment, while only a single observation, is at least suggestive that the addition of shock to shock—which is precisely what we bring about when we submit a woman to an immediate operation for ruptured tubal pregnancy—is very likely to prove fatal.

Series 3. *Division of the Uterine Vessels and Observations upon the Pulse, Respiration, Blood Pressure, and Hemoglobin.*

Dog No. 18. *February* 28. Brown, long-haired bitch pup. Weight, 12 pounds. Before starting anesthetic the pulse was 132.

11.20. Anesthetic started.

11.40. Pulse, 162; respiration, 46.

12.00. Pulse, 180; respiration, 52; hemoglobin, 120.

12.00. Pulse, 180; respiration, 52; hemoglobin, 120; mercury manometer connected with femoral artery; blood pressure, 130 mm. of mercury.

12.05. Pulse, 182; respiration, 80.

12.06. Abdominal incision made.

12.10. Sulphate of morphine, $\frac{1}{2}$ grain, hypodermically; uterine vessels on one side were cut.

12.15. Blood pressure, 100 mm. of Hg.

12.20. Pulse, 108; respiration, 60; hemoglobin, 98.

12.25. Pulse, 124; respiration, 66.

12.30. Pulse, 104; respiration, 120.

12.35. Pulse, 132; respiration, 180; hemoglobin, 110 (?).

12.40. Pulse (not taken); respiration, 108.

12.45. Pulse, 134; respiration, 162; blood pressure, 90 mm. of Hg.

12.50. Pulse, 120; respiration, 168; hemoglobin, 98.

12.52. Abdomen reopened and clot removed from cut end of vessels.

1.15. Pulse, 128; respiration, 168.

1.30. Sulphate of morphine, ½ grain, hypodermically.

1.40. Abdominal wall closed.

3.00. Dog walking around.

February 29. Dog appears to be feeling fairly well today.

March 3. Dog not very active; acts as if she were toxic.

4*th*. Died today. Abdominal wound gangrenous, having completely broken down. No free fluid or blood in abdominal cavity. Over the cut end of vessels there is a well-formed clot. Between the uterus and bladder there are a few fine adhesions. Liver and spleen enlarged and soft. Other organs apparently normal.

Dog No. 15. *February* 12. White bull bitch; weight, 34 pounds. Before operation, pulse 180 to 200; hemoglobin, 127.

11.32. Both uterine and ovarian vessels cut.

11.35. Sulphate of morphine, 1 grain, hypodermically.

11.48. Pulse, 180; respiration, 60.

11.55. Pulse, 152; respiration, 90 (shallow).

12.00. Hemoglobin, 115.

12.10. Pulse, 140; respiration, 72.

12.15. Pulse, 132; respiration, 60; hemoglobin, 115.

12.25. Sulphate of morphine, ½ grain, hypodermically; pulse, 132 (?); respiration, 50.

12.30. Abdomen reopened and six ounces of bloody fluid sponged out.

12.35. Pulse, 140.

12.45. Pulse, 136; respiration, 30.

1.00. Pulse, 120; respiration, 30. Dog remained dazed and sleepy all afternoon.

February 13. Dog lively; seems to be feeling well.

17*th*. Dressings removed. Incision broken down. Edges edematous and a bloody serous fluid discharging from wound. Red blood corpuscles, 6,956,000; hemoglobin, 110.

18*th*. Dog lively; eating; feeling well.

20*th*. Wound nearly closed; dog doing very well.

March 2. Before operation, pulse 160.

10.20. Anesthetic started.

10.35. Pulse, 186; respiration, 28.

10.45. Sulphate of morphine, ½ grain, hypodermically.

10.50. Ether discontinued.

11.00. Began opening neck to insert cannula in left carotid artery. Pulse, 198; respiration, 42; hemoglobin, 130.

11.10. Sulphate of morphine, ½ grain hypodermically; respiration, 28.

11.20. Mercury manometer connected with left carotid artery. Blood pressure, 120 mm. of mercury.

11.25. Abdominal incision made.

11.30. Sulphate of morphine, ½ grain, hypodermically.

11.32. Right uterine vessels cut on uterine stump.

11.34. Abdominal wall closed with hemostatic forceps.

11.37. Pulse, 180; respiration, 42; blood pressure, 120 mm. of Hg.; hemoglobin, 120.

11.45. Pulse, 172; respiration, 48.

11.50. Blood pressure, 110; hemoglobin, 115.

12.15. Abdomen opened. Pretty well filled with bloody fluid. A fairly well-organized clot found over the cut end of right uterine vessels. There was no active bleeding until after pelvic contents had been manipulated, then the blood welled up out of abdominal incision.

12.25. Closure of abdominal wound begun.

12.30. Sulphate of morphine, ½ grain, hypodermically; pulse, 168; respiration, 32; blood pressure, 110; hemoglobin, 115. Dog remained sleeping remainder of afternoon.

3*d*. Dog lies quietly this morning.

5*th*. Dog feeling well; walking around.

15*th*. Dog perfectly recovered.

April 23. Hemoglobin, 105.

Résumé. In Dog No. 1 of this series the blood pressure had dropped from 130 mm. of mercury to 100 mm. of mercury within five minutes after the uterine vessels had been cut, and in thirty minutes more the blood pressure was 90 mm. of mercury. During this period of time the hemoglobin fell in all 22 points (from 120 to 98).

In another experiment (this dog had been operated upon five days previously), both ovarian and uterine vessels having been cut, the hemoglobin fell from 127 to 115 in forty-three minutes. Five days after the operation the hemoglobin was 110. Eleven days afterward a second operation was carried out similar to that upon Dog No. 1 of this series. The blood pressure, which was 120 mm. of mercury, one hour after section of the right uterine vessels, fell to 110. The hemoglobin at the beginning of the experiment was 130, and fell to 115 an hour after the cutting of the vessel.

As might be supposed, the blood pressure falls slightly and the hemoglobin drops as usual immediately after division of the vessels. As soon, however, as the bleeding ceases, the hemoglobin stops going down and remains stationary for a time, and the blood pressure rises.

Series 4. *Division of the Vessels and Observations of the Pulse, Respiration, and Hemoglobin, with Especial Reference to the time of the Clotting of the Blood.*

Dog No. 16. *February* 18. Fox terrier and bull bitch. Weight, 16 pounds. Before starting anesthetic pulse was 156; respirations not taken; hemoglobin, 130.

9.55. Anesthetic started.

10.05. Pulse, 180; respiration, 60.

10.25. Operation started. Pulse, 176; respiration, 68.

10.35. Pulse, 160; respiration, 60.

10.37. Left uterine vessel cut. Pulse, 176; respiration, 52.

10.45. Pulse, 200+; respiration, 56.

10.55. Pulse, 240 (?); respiration, 52.

11.00. Sulphate of morphine, ½ grain, hypodermically; hemoglobin, 110.

11.05. Pulse, 176; respiration, 32.

11.15. Pulse, 160; respiration, 28; hemoglobin, 110.

11.30. Pulse, 154; respiration, 24; hemoglobin, 110. The bleeding in pelvis now practically ceased. There are numerous small blood clots between intestines and bladder and over the cut end of the left uterine vessels.

11.45. Pulse, 140; respiration, 33; hemoglobin, 110.

11.50. Pulse, 132; respiration, 32.

11.54. Sulphate of morphine, ½ grain, hypodermically.

11.55. During last fifteen minutes there has been no fresh bleeding. Clots are firmer. Dog is resting quietly. Femoral pulse is regular and of good volume. Pulse and respiration about the same as at 11.50. Four ounces of bloody fluid sponged from abdominal cavity. There is a well-formed clot over the proximal cut end of uterine vessels. Clot removed and active bleeding started again (weight of this clot 1 gram).

12.50. Dog remained sleeping all afternoon.

February 19. Dog takes liquids, but not very active.

20*th*. Dog walking around. Has eaten solid food today. Hemoglobin, 115.

27*th*. Dog's condition has gradually improved, although she is considerably emaciated. Bandages removed today, leaving open a raw, granulating, broken-down wound.

28*th*. Dog was walking around this morning. Found dead this afternoon.

Autopsy. On opening the abdomen, three loops of small intestines were found adherent to the abdominal wall immediately under the wound. Abdominal wall incision had

completely broken down except the peritoneal layer. Muscle and skin layers widely retracted. No free fluid in abdominal cavity. No blood found. A few fine adhesions behind the bladder. Right uterine vessels seemed normal. Left uterine vessels thrombosed. Liver somewhat swollen. Other organs appear normal.

Dog No. 17. *February* 21. Black and white fox and Skye terrier bitch. Weight, 21 pounds. Before anesthetic was started, pulse 128.

10.30. Anesthetic started (ether).

11.10. Operation started; hemoglobin, 140.

11.15. Anesthetic stopped; pulse, 160; respiration, 56.

11.16. The uterine vessels on both sides cut, the stumps being dropped back into abdominal cavity with catgut guides attached to the broad ligaments.

11.20. Sulphate of morphine, ½ grain, hypodermically; respiration, 48.

11.25. Pulse, 196; respiration, 64; hemoglobin, 130.

11.30. Sulphate of morphine, ½ grain, hypodermically.

11.35. Considerable vomiting and straining, then dog became very quiet.

11.35. Pulse, 168; respiration, 150; hemoglobin, 125.

11.45. Pulse, 200; respiration, 200.

11.50. Pulse, 180; respiration, 180; hemoglobin, 125.

12.00. Respiration, 150.

12.05. Pulse, 156; respiration, 138.

12.10. Pulse, 152; respiration, 104.

12.15. Abdomen reopened. Pulse, 154; respiration, 66. No bleeding found. There are several large clots on the left side. On drawing up the uterus and separating the clots on the left side the bleeding recommenced. Same occurs on removing small clot from the right side.

12.30. Pulse, 112; respiration, 56.

12.40. Abdominal wall closed.

4.00. Pulse, 140. Dog slept all afternoon.

February 22. Dog active and feeling good. Hemoglobin, 125. Dog made a very rapid recovery. Skin incision healed perfectly, and this dog was used again April 24, as Dog No. 20.

Résumé. In this series we endeavored to trace some connection between the pulse, respirations, and the hemoglobin values and the formation of the blood clot; or, in other words, the cessation of the bleeding.

In the first dog of this series, in eight minutes after the left uterine vessels had been cut, the pulse had risen from 200 to 240, and the respirations were 52. In twenty-three minutes after the severance of the vessels the hemoglobin had fallen twenty points, but taken fifteen to thirty minutes later the hemoglobin showed the same reading. After the hemoglobin ceased going down, the pulse and respirations began to improve, the pulse going to 154 and the respirations to 24. On reopening the abdomen we found a number of clots lying between the intestines and the bladder and around the cut ends of the vessels. One clot, which weighed 1 gram, was removed and active bleeding started up again. The abdomen was again closed. On February 28, ten days after the operation, she developed a septic peritonitis from the infected abdominal incision, and died.

We have carried out this experiment frequently enough in dogs to make us feel reasonably certain that from the hemoglobin readings alone we can tell the time at which the clot has formed in the vessels. In every instance in which the hemoglobin ceases to go down and the reading remains stationary (and this in our experience always occurs) and the abdomen is reopened, a well-formed clot will be found occluding the vessels. I believe that the hemoglobin readings will be found very useful in cases of intra-abdominal hemorrhage from a ruptured ectopic pregnancy, and that when we see that the hemoglobin remains stationary we can feel confident that we are doing the best for the patient in not operating at once.

The experiments in this group of dogs may be divided into three distinct portions: (1) In the first the pulse and respirations become very rapid after the division of the uterine vessels, the pulse becoming in some instances so fast that it is practically impossible to count it. During this time the hemoglobin will fall from ten to twenty points. This portion of the experiment occupies about twenty minutes. (2) During the next fifteen to twenty minutes the dog looks as if it would die, but the hemoglobin remains practically stationary. If the abdominal cavity is now reopened a well-defined blood clot will be found about the incised vessel and the pedicle, and the bleeding will have ceased. (3) During the third fifteen to twenty minutes the pulse and respiration start to improve again, and the dogs begin to show evidences of reacting. As a rule, from then on the recovery is without incident.

Series 5. *Division of Vessels, Observations on the Pulse, Respirations, and Hemoglobin before and after Bandaging and after Applying Weights to the Lower Abdomen.*

Dog No. 19. *March* 13. Small brown short-haired bitch pup. Weight, 8 pounds.

10.45. Pulse, 190; respiration, 48; hemoglobin, 85 to 90.

10.46. Abdominal incision.

10.50. The uterine vessels on both sides cut.

11.00. Abdomen closed (skin clamps used).

11.05. Pulse, 200; respiration, 48; hemoglobin, 90. Tight pressure bandages applied.

11.10. Sulphate of morphine, $\frac{1}{2}$ grain, hypodermically. Dog vomited almost immediately.

11.20. Pulse, 150; respiration, 20; hemoglobin, 90.

11.35. Pulse, 96; respiration, 24.

12.35. Pulse, 100; respiration, 12.

3.00. Pulse, 108; respiration, 12. Dog drinking water; pulse very irregular.

March 14. Dog not so quiet. Pulse, 160, irregular.

15*th*. Dog quiet. Pulse, 156, more regular.

21*st*. Dog walking around. Wound appears clean. Fresh dressings applied.

25*th*. Edges of wound not so clean as on the 21st; fresh dressing.

30*th*. Dressing removed; dog licks wound; wound looks better.

April 5. Dog emaciated, but seems to be doing fairly well.

10*th*. Dog emaciated, but has considerable abdominal distention.

12*th*. Abdomen markedly distended. Skin clamps still in place. Dog not very active. Hemoglobin, 90.

Autopsy. Dog killed with ether. Abdominal cavity contains a considerable amount of purulent fluid. Bladder markedly distended. Omentum adherent to abdominal wall along the old incision, which had completely healed. Lymphatics of intestines white, and stand out distinctly. Liver yellow, fatty, swollen. Spleen soft and swollen. Heart and lungs appear normal. Smears from abdominal fluid show many pus cells, in some of which a few cocci can be found.

Dog No. 20. *March* 13. Brown long-haired bitch pup, white belly. Weight, 10 pounds. Pulse before starting anesthetic, 168.

11.40. Anesthetic started.

11.42. Pulse, 168; respiration, 60.

11.48. Abdominal incision made. Hemoglobin, 85.

11.50. Pulse, 200; respiration, 92.

11.55. The uterine vessels on both sides cut. Pulse, 190; respiration, 80; hemoglobin, 87.

12.00. Sulphate of morphine, $\frac{1}{2}$ grain, hypodermically. Pulse, 188; respiration, 68.

12.05. Pulse, 144; respiration, 48; hemoglobin, 80.

12.10. Anesthetic stopped and abdomen closed. Pulse, 116; respiration, 40.

12.26. (Before pressure bandage was applied.) Pulse, 198; respiration, 69.

12.32. (After pressure was applied.) Pulse, 220; respiration, 52; hemoglobin, 85.

3.00. Dog drinking water. Pulse, 180; respiration, 24.

March 14, 3 P.M. Pulse, 128, regular. Dog quiet.

15*th*, 1 P.M. Pulse, 140, regular. Dog quiet.

24*th*. Bandage taken off; wound clean. Dog active and feeling good.

April 12. Dog had been active and doing very well until two days ago, when she refused to eat, and on April 11, at 6 P.M., she died.

Autopsy. Incision clean and perfectly united. There are a few adhesions between omentum and abdominal wall along the old wound. No free fluid and no blood in abdominal cavity. Peritoneal surface smooth and apparently clear. Bladder small. Uterine stumps free. No adhesions, but tissues about it are somewhat blood-stained. Intestines, spleen, liver, heart, lungs, etc., appear normal.

Dog No. 21. *March* 21. Black and tan short-haired bitch, tan muzzle, white throat, and four white feet. Weight, 16 pounds.

10.30. Anesthetic started. Pulse, 88; very irregular.

10.45. Pulse, 160; respiration, 32; hemoglobin, 125.

11.20. The uterine vessels on both sides cut.

11.25. Pulse, 162; respiration, 56.

11.27. Abdomen closed.

11.30. Light pressure bandage applied. Pulse, 132 to 136; respiration, 48; hemoglobin, 110.

11.50. Pulse, 126; respiration, 40.

11.55. Pulse, 128; respiration, 30, labored.

12.00. Pulse, 144, irregular.

12.05. Pulse, 172, regular in force and rhythm; respiration, 20.

12.20. Pulse, 136 to 156; respiration, 14.

12.23. Sulphate of morphine, ½ grain, hypodermically.

12.30. Pulse, 148, more regular and better quality; respiration, 12; hemoglobin, 110.

March 22, 5.00 P.M. Dog quiet; pulse, 132.

25*th.* Bandage removed; wound dressed again. Incision looks clean; doing well. Dog feeling fairly well.

April 25. Dog has made an uninterrupted recovery. Is now well nourished and in very good condition.

Dog No. 22. *March* 24. Big long-haired black and white bitch pup. Weight, 50 pounds.

10.20. Anesthetic started.

10.30. Pulse, 144; respiration, 100.

10.46. Incision made. Hemoglobin, 115.

10.50. Hemoglobin, 115.

11.06. The uterine vessels on both sides were cut and sutures previously placed for closing abdominal walls were tied as soon as possible; rubber pressure bandage applied.

11.10. Hemoglobin, 110.

11.15. Pulse, 104; respiration, 32.

11.20. Pulse, 200; respiration, 36.

11.27. Pulse, 150 to 152; respiration, 48.

11.35. Pulse, 128 to 132; respiration, 24.

11.55. Pulse, 132; respiration, 24.

12.05. Dog whining. Hemoglobin, 100.

12.15. Pulse, 200; respiration, 20.

12.20. Sulphate of morphine, 1 grain, hypodermically.

March 25, noon. Pressure bandage removed. Pulse 150 before removing pressure; pulse 150 after removing pressure; hemoglobin, 100.

26*th.* Dog walking around.

30*th.* Dog active; doing very well.

April 15. Dressing removed. Hemoglobin, 100.

23*d.* Hemoglobin, 95.

Dog No. 23. *April* 15. Water spaniel bitch. Weight, 25 pounds; before operation pulse 160.

10.25. Incision made. Hemoglobin, 108.

10.40. Left uterine vessels cut.

10.45. Pulse, 172; respiration, 48.

10.47. Abdomen closed.

10.48. Hemoglobin, 95.

10.50. Rubber pressure bandage applied.

10.55. Pulse, 156; respiration, 58.

10.56. Hemoglobin, 90.

11.15. Pulse, 114; respiration, 40; hemoglobin, 85 (?).

11.25. Dog vomiting and whining. Pulse, 180; respiration, 28.

11.30. Sulphate of morphine, ½ grain, hypodermically. Dog whining.

11.35. Pulse, 156; respiration, 28.

11.45. Dog perfectly quiet. Pulse, 140; respiration, 28.

12.15. Dog perfectly quiet. Pulse, 148; respiration, 20; hemoglobin, 90.

12.30. Dog perfectly quiet. Pulse, 154; respiration, 16.

2.10. Pulse, 148; respiration, 18.

2.45. Pulse, 148; respiration, 24; hemoglobin, 100 (?).

2.55. Dog perfectly quiet.

3.30. Dog perfectly quiet. Hemoglobin, 90.

3.40. Dog moving head. Pulse, 140; respiration, 14.

5.00. Dog whining. Pulse, 138; respiration, 12; hemoglobin, 90. Legs swollen, edematous, blue, and cold.

5.10. Pressure bandage removed.

5.15. Sulphate of morphine, ½ grain, hypodermically.

5.30. Pulse, 140; respiration, 20; hemoglobin, 90. Legs warm; swelling and edema have disappeared. Dog walks, but drags left leg.

April 16. Dog walks about, but seems sluggish.

17*th*. About the same as yesterday; eating, and bowels moving.

19*th*. Dog still prefers to be quiet. Bandages removed.

25*th*. Dog feeling better.

Dog No. 24. *April* 20. Brown short-haired bitch; toes white-tipped. Weight, 13 pounds. Pulse before starting anesthetic, 164 (pulse taken through entire experiment at heart apex with stethoscope).

10.40. Anesthetic started.

10.52. Incision made.

10.59. The uterine vessels on both sides cut. Pulse, 140; respiration, 30; hemoglobin, 125.

11.00. Pulse, 154; respiration, 80.

11.01. Closure finished.

11.02. Hemoglobin, 125.

11.04. Abdomen compressed with hands, then two-pound weight applied until 11.00.

11.11. Twelve-pound weight applied to abdomen. Pulse, 154; respiration 36.

11.12. Dog vomited. Hemoglobin, 115.

11.20. Pulse, 118, good volume and quality; respiration, 24.

11.25. Pulse good volume and quality. Hemoglobin, 115.

11.30. Pulse, 116, good volume and quality; respiration, 24.

11.31. Twelve-pound weight removed from abdomen.

11.35. Abdomen reopened. Pedicles drawn up. Clot torn off of cut end of right uterine vessels in drawing up the stump, leaving a pulsating hemorrhage. A firm clot remained over cut end of left uterine vessels. This was removed and the uterus dropped back into abdomen.

11.42. Reclosure of abdomen started. Pulse, 116; respiration, 28.

11.47. Pulse, 124; respiration, 24.

11.52. Hemoglobin, 107.

11.55. Twelve-pound weight again applied to abdomen. Pulse, 132; respiration, 16.

11.57. Pulse, 114, better volume and quality; respiration, 16.

12.05. Pulse, 128; respiration, 20; hemoglobin, 105.

12.09. Twelve-pound weight removed.

12.10. Pulse, 138; respiration, 16.

12.15. Sulphate of morphine, ½ grain, hypodermically.

April 21. Dog walking around.

23*d*. Dressings removed.

25*th*. Doing very well.

Dog No. 25. *April* 21. Black and white long-haired bitch pup. Weight, 12 pounds. (Pulse throughout entire experiment taken at heart apex with stethoscope.)

11.05. Anesthetic started.

11.20. Pulse, 200; respiration, 120; hemoglobin, 98.

11.25. Hemoglobin, 98.

11.30. Incision made.

11.33. The uterine vessels on both sides cut.

11.35. Pulse, 132; respiration, 96; hemoglobin, 97.

11.36. Abdomen closed and four-pound weight applied.

11.40. Pulse, 120; respiration, 62.

11.42. Hemoglobin, 88.

11.50. Three and one-half pounds added. Total, seven and one-half pounds. Pulse, 120; respiration, 62.

11.55. Pulse, 100; respiration, 80; hemoglobin, 88.

12.00. Dog struggling some. Pulse, 120; respiration, 80.

12.10. Pulse, 120; respiration, 92; hemoglobin, 88.

12.16. Weight removed from abdomen and sulphate of morphine, ½ grain, hypodermically.

12.20. Pulse, 120; respiration, 80.

12.35. Pulse, 86; respiration, 140 (?).

2.30. Dog quiet. Pulse, 88; respiration, 14.

April 22. Dog walking around.

25*th*. Dog doing very well.

Dog No. 26. *April* 22. Brown long-haired Skye terrier bitch pup. Weight, 13½ pounds. Before starting operation, pulse 160.

10.20. Anesthetic started. Pulse taken with stethoscope at heart apex.

10.40. Pulse, 218; respiration, 80; hemoglobin, 100.

10.50. Pulse, 196; respiration, 112.

10.57. Sulphate of morphine, $\frac{1}{4}$ grain, hypodermically.

11.00. Incision made.

11.05. Pulse, 160; respiration, 100; hemoglobin, 100.

11.09. Distended bladder tapped.

11.15. The uterine vessels on both sides cut. Pulse, 152; respiration, 108.

11.18. Abdomen closed.

11.20. Pulse, 140; respiration, 112; hemoglobin, 100.

11.21. Three and three-quarter pound weight placed on abdomen.

11.22. Respiration, 86.

11.27. Hemoglobin, 95.

11.30. Pulse, 120; respiration, 80 (jerky).

11.35. Pulse, 120; respiration, 86; hemoglobin, 95.

11.39. Four and three-quarter pounds added (total eight and one-quarter pounds on abdomen).

11.42. Weight on abdomen increased to ten and one-quarter pounds.

11.45. Hemoglobin, 95.

11.50. Pulse, 100; respirations, 76; hemoglobin, 95.

11.51. All weights removed.

11.56. Pulse, 120; respiration, 80; hemoglobin, 95.

12.00. Pulse, 120, good quality; respiration, 68.

12.08. Ten and one-quarter pound weight again applied to abdomen. Pulse good.

12.16. Pulse, 132; respiration, 60.

12.21. Pulse, 120; respiration, 44.

12.34. Sulphate of morphine, $\frac{1}{4}$ grain, hypodermically. Pulse, 120; respiration, 44. All weights removed.

April 23. Dog walking around; condition good.

25*th*. Condition good.

Dog No. 27. *April* 24. This is the dog used as Dog No. 9. Weight 21 pounds. (Pulse taken with stethoscope at heart apex.)

10.25. Anesthetic started.

10.30. Pulse, 140; respiration, 48.

10.40. Hemoglobin 100 (?).

10.45. Abdominal incision.

10.49. Top of uterus and lower portion of both oviducts excised.

10.50. Pulse, 132; respiration, 56; hemoglobin, 110.

10.52. Abdominal closure finished and five-pound weight applied. Pulse, 120; respiration, 52.

10.57. Pulse, 148; respiration, 44; hemoglobin, 109.

11.03. Pulse, 176; respiration, 50; hemoglobin, 103.

11.10. Pulse, 176; respiration, 48; hemoglobin, 103.

11.20. Sulphate of morphine, $\frac{1}{4}$ grain, hypodermically.

11.25. Four pounds of weight added (total nine pounds). Pulse, 180; respiration, 48.

11.35. Pulse, 160; respiration, 36; hemoglobin, 98.

11.40. Pulse, 160; respiration, 40; hemoglobin, 103.

11.45. Sulphate of morphine, $\frac{1}{4}$ grain, hypodermically. Pulse, 160; respiration, 36.

11.50. Pulse, 176; respiration, 32.

12.00. Pulse, 192; respiration, 32.

12.10. Pulse, 192; respiration, 36.

12.15. All weights removed. Pulse, 168, irregular; respiration, 36.

12.20. Pulse, 160; respiration, 36.

12.30. Pulse, 156; respiration, 36.

6.00. Dog lies quietly looking around.

April 25. Dog walks around barking.

Résumé. I wish to call attention to one or two striking experiments in this series.

Dog No. 19. Weight, 8 pounds. The pulse immediately after both uterine arteries and veins had been cut and before a tight abdominal bandage had been applied was 200, and the respirations were 48. Forty-five minutes later the pulse was 96 and the respirations were 24. Four hours and ten

minutes after the cutting of the uterine vessels the pulse was 108 and the respirations were 12.

In Dog No. 21 the hemoglobin, which before the cutting of the vessels was 125, fell to 110 in ten minutes. The bandage was then applied to the abdomen and the pulse from 162 and the respirations from 56 came down to 126 and 40 respectively in twenty minutes. Fifty minutes later the pulse varied between 156 and 136 and the respirations between 14 and 20, the hemoglobin still remaining at 110. In two similar experiments a rubber tourniquet was applied after cutting the vessels, and the results were somewhat similar.

In Dogs Nos. 17, 18, 20 still more striking results in the pulse, respiration, and hemoglobin were obtained by applying weights to the lower abdomen, and thus bringing the anterior in more direct apposition with the posterior abdominal wall.

Thus, in Dog No. 17, which weighed 13 pounds, twelve minutes after cutting the uterine vessels the pulse was 154, the respirations were 36, and the hemoglobin had fallen ten points. A twelve-pound weight was applied to the abdomen, and in eight minutes the pulse had fallen to 118 and the respiration to 24, but the hemoglobin remained stationary. After ten minutes the pulse was 116 and the respirations were 24. We now opened the abdomen and exposed the vessels; they were surrounded by a firm clot. The clot was removed and the pedicles were dropped back into the abdomen. The pulse and respirations rose again, and the hemoglobin fell to 107; eight points lower than it was before the fresh hemorrhage was started up. The weight was applied again to the abdomen, and in two minutes the pulse had fallen from 134 to 114. Twelve minutes later the weight was removed again, and immediately the pulse rose to 148.

One other striking experiment in a dog that weighed 12 pounds in this group showed that in five minutes after putting a seven and a half pound weight on the abdomen the pulse

had fallen from 120 to 100 and the hemoglobin from 98 to 88. This and other experiments with pressure, particularly when it is applied so that the anterior and posterior abdominal walls are brought more closely together, would suggest the application of pressure over the lower abdomen in cases of a hemorrhage from a ruptured ectopic pregnancy. This might possibly be carried out by the use of shotbags or sandbags of known weight, as much weight being employed as the patient could comfortably stand. As our experiments showed, by using the weight in the way just described the results were more striking than when the abdomen was simply bandaged.

Series 6. *Division of Uterine Vessels, with Dog in the Perpendicular Position; Observations upon Pulse, Respiration, and Hemoglobin.*

Dog No. 28. *April* 27. Same dog as used April 15 as Dog No. 16. Weight, 24½ pounds. Pulse before starting anesthetic 148.

10.20. Anesthetic started.

10.32. Pulse, 148; respiration, 68; hemoglobin, 75.

10.35. Hemoglobin, 75.

10.38. Incision made. On opening peritoneal cavity no fluid present. A few adhesions between the intestines; posterior portion of the bladder adherent to the uterus. At this point a markedly organized blood clot. The left uterine vessels thoroughly thrombosed.

10.52. The uterine vessels on both sides cut.

10.54. Ether anesthesia stopped. Sulphate of morphine, ½ grain hypodermically, given and foot of table elevated two and one-half feet.

10.56. Foot of table raised to perpendicular position.

11.00. Pulse, 200; respirations, 28; hemoglobin, 65.

11.06. Pulse, 180; respiration, 28; hemoglobin, 65.

11.12. Hemoglobin, 62.

11.16. Pulse, 140; respiration, 24; hemoglobin, 61.

11.18. Hemoglobin, 61.

11.25. Pulse, 160; respiration, 28; hemoglobin, 62.

11.36. Pulse, 160; respiration, 28.

11.45. On reopening the peritoneal cavity a well-marked clot was seen near bladder and incised uterine vessels. No bleeding at this point. On pulling the tissue and clot forward and separating them the oozing began from the left uterine vessels. The pelvic cavity was free from blood. On making pressure on the upper abdomen, bloody fluid came out of incision, which had been prolonged up toward head for two and one-half to three inches. Clot removed from left vessels. Right vessels not disturbed. Three minutes after removing clot from left uterine vessels, hemoglobin 55.

12.30. Table lowered to horizontal position. Pulse, 200; respiration, 44.

12.32. Hemoglobin, 54.

6.00 P.M. Dog drinking water.

April 28. Dog found dead this morning. On opening the abdomen the intestines are found surrounded by clotted blood. Blood clots found above and below the liver and throughout the cavity. No new-formed adhesions found. Both uterine vessels cut ends covered with blood clots. Intestines, liver, spleen, heart, lungs, etc., appear normal. Bladder small and walls rather firm.

Dog No. 29. *April* 28. Same dog as that used for No. 13. Weight, 23½ pounds. Before starting anesthetic pulse 72.

11.40. Pulse, 200; respirations 44.

11.50. Sulphate of morphine, ½ grain, hypodermically Ether discontinued.

11.52. Pulse, 200; respiration, 24; hemoglobin, 100.

11.54. Incision made with table in perpendicular position; head down. Bladder found adherent to broad ligament near

site of formerly incised vessel. Peritoneum, oviducts, and body of uterus pale. Thrombosis in both uterine arteries well organized. Dog whining.

11.58. Both uterine vessels cut. Dog whining less than before vessels were cut.

12.00. Dog vomited. Straining and whining.

12.07. Sulphate of morphine, $\frac{1}{4}$ grain, hypodermically. Hemoglobin, 97.

12.10. Sulphate of morphine, $\frac{1}{4}$ grain, hypodermically.

12.10. Blood clot at seat of incision glazed over and vessel pulsates through partially clotted blood. Dog struggling markedly, forcing blood and omentum out through the incision.

12.15. Ether given in mask and sulphate of morphine, $\frac{1}{4}$ grain, hypodermically.

12.30. Closure.

12.50. Sulphate of morphine, $\frac{1}{4}$ grain, hypodermically. Pulse, 168; respiration, 20; hemoglobin, 92.

1.30. Pulse, 132, irregular; respiration, 16.

5.00. Dog awake, looking around.

April 29. Dog active.

May 2. Dressing removed; wound doing well. Dog active and playful.

Résumé. In the first dog the pulse had fallen from 200 to 180 ten minutes after the dog had been placed in the upright position, but the hemoglobin remained stationary. After twenty minutes the pulse had fallen to 140 and the hemoglobin had also dropped four points. In twenty minutes more the pulse had risen to 160, but the hemoglobin remained practically stationary. The abdominal cavity was reopened and a well-defined clot was seen covering the incised tissues; the vessel had ceased to bleed.

In the second dog the vessels were cut with the dog in the perpendicular position, and the bleeding vessel was observed through a strong magnifying glass in order to compare the

time of clotting with the hemoglobin readings. The hemoglobin had fallen three points in seven minutes after incision of the vessels. After three minutes more the incised tissues had begun to take on a glazed appearance, and the hemoglobin remained stationary (ten minutes after the uterine vessels had been cut). Three minutes later the dog began to struggle and to force the abdominal contents through the incision, and the hemoglobin taken forty minutes later showed a fall of five points more. One hour and twenty minutes later the pulse was 132, the respirations were 16 (the hemoglobin was not taken). In this experiment we would have to consider the influence that the air would have in helping to cause the clotting of the blood, and as a consequence the slight drop in the hemoglobin index.

Conclusions. From these experiments, which now number 31, we feel justified more and more in believing that the intra-abdominal hemorrhage, such as is met with in women suffering from collapse after the rupture of an ectopic gestation, is not sufficient in itself to cause a fatal termination in these cases. Death is caused mainly by shock, which may be increased by various procedures. The hemorrhage per se is rarely if ever the sole cause of death.

One experiment goes to show that the superadded shock belonging to immediate operation is likely to be very dangerous.

It will doubtless be maintained by some that our experimental work has shown nothing more than that the dog can withstand a greater loss of blood than a woman—a recognized fact. And yet it seems fair to assume, as will be seen on consulting our protocols, that in many of our experiments we made the tests sufficiently severe to more than equalize the factor of resistance to the loss of blood in the dog, as compared with that of the human being under fairly similar conditions. In other words, taking into consideration this difference in resistance by cutting both uterine arteries and veins, and in some instances both ovarian arteries and veins

as well, we subjected our dogs to a risk of bleeding to death as great as or greater than that incurred by the average woman suffering from a ruptured tubal pregnancy.

Our experiments further show that the clotting probably occurs within fifteen to twenty minutes after the vessels have been incised, and that the time of clotting can be known by observing the hemoglobin index. The subcutaneous injection of normal salt solution in all probability does not cause a renewal of the hemorrhage. But manipulation of the tissues by disturbing the clot causes the bleeding to start up again, and may thus be mistaken for a continuing hemorrhage.

Our experiments also show that by the use of bandages, but more particularly by the application of more or less weight to the lower abdomen, the pulse is rendered slower and of better quality, and that the hemoglobin is kept up.

It gives me great pleasure to acknowledge the valuable assistance given me in the carrying out of these experiments by my former assistant, Dr. M. B. Bonta, and by my present assistants, Drs. Frank C. Ainley and Fred. W. Hall.

PRESSURE CONDITIONS WITHIN THE ABDOMEN.

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Investigation into the question of pressure conditions within the abdomen has not been as extensive as the importance of the subject would seem to demand. To the gynecologist and obstetrician the theme is, perhaps, one of theoretical rather than practical interest, and yet it seems quite necessary in considering many and various pelvic and abdominal conditions that our ideas in regard to it should be clear. This is perhaps particularly so in discussing uterine displacements and the mechanism of labor—matters we will not enter into here except to suggest a more accurate application of the facts brought out. The obstacles attending experimental work in this direction are apt to be great and sometimes apparently insurmountable. Every real advance in our knowledge of the subject, however, has been made only in this direct way or by means of clinical observation. To be sure, a concise knowledge of certain laws is necessary to a proper understanding, but the conditions are so complex that one is easily led into error if he depends alone upon his knowledge of physics. In fact the application of such laws to one's theories has resulted in about as many mistakes as purely theoretical speculation. When, for example, Meyer asserts that so-called negative pressure cannot exist within the abdomen because the abdominal walls are elastic and would meet at once any such difference of pressure, he did

not take into consideration that *all* the walls are not elastic —a circumstance which materially affects the results. Much that has been taught has been erroneous. Barrett, in a very recent article, points out a number of such errors and pleads for more accurate teaching along this line. Among the grossest of these in the literature of the past may be noted (*a*) the so-called retentive power of the abdomen, a theory that atmospheric pressure upon the abdominal walls and perineum is a factor in the maintenance of the pelvic organs in a proper position, and (*b*) that the uterus is held in anteversion because of the inability of two peritoneal surfaces (bladder and uterus) to leave one another. With the advance of gynecology and obstetrics and the recourse to direct experiment and observation rather than to theory, our ideas on this subject have also been bettered. A reference to a few of our latest text-books shows neither of these factors mentioned as having to do with uterine support. (Bovée, 1906 (article by Goffe); Dudley, 1904; Hirst, 1905; Kelly, 1906; Kelly-Noble, 1907; Reed, 1901; Veit, 1907 (article by Küstner). Ashton, 1906, however, speaks of the retentive power of the abdomen. This teaching seems to have come from Duncan (1865), who has been extensively quoted. Many text-books, even very recent ones, in considering the etiology of displacements of the uterus, speak of intra-abdominal pressure much as though it were the direct downward pressure of a solid body. Few have attempted to take up the matter in detail. Küstner (Veit's *Handbuch*), however, devotes a short chapter to it. Even in the literature devoted exclusively to the subject, the term "abdominal pressure" seems to have led to a definite conception of an ever-present and universal positive pressure independent of conscious muscular strain. This use of the term has led to some rather interesting and energetic controversy. The term is, perhaps, rather indefinite, but hard to avoid. Certainly, in our text-books it is commonly meant to signify that pressure

brought about by contractions of the muscular walls of the abdomen, and in this sense, at least, has a legitimate use. We shall use the term without further apology, hoping that the context will explain its intended meaning.

My purpose in this paper is to set forth, as briefly and clearly as possible, the main points of what has already been accomplished toward a better understanding of the subject and to plead for greater accuracy in the application of the facts as they exist. My own observations are limited to a considerable number of informal clinical investigations and experiments made during the past few years.

Let us describe in brief the conditions with which we have to deal: The abdomen is an air-tight cavity, lined with a smooth membrane, the peritoneum, and filled with organs covered by the same tissue and permitting of great freedom of movement and change of position. The hollow organs have muscular walls of their own, which produce special pressure conditions not to be dealt with in detail here. Some of the walls of the cavity are rigid, some distensible, so that a very considerable change in the form and volume of the cavity is readily permitted. The posterior wall is fairly rigid and allows of but little movement and change in form. Above is the so-called thoracic abdomen, the walls of which are non-collapsible, but do permit of considerable contraction and expansion. Between the abdomen and thorax is a thin muscular partition, the diaphragm. Beyond the diaphragm, the elastic lungs tend always to draw the diaphragm upward. Below is the pelvis, bordered on four sides by rigid walls. Its lower outlet is closed by a strong wall of fascia and muscle which gives a little under strain. Great change in the form and position of the abdominal contents is permitted, chiefly through the expansive anterior wall composed also of muscle and fascia. The solid organs, including the uterus in non-pregnant state, lie protected from injury in the less collapsible portions of the abdomen (the

pelvis and thoracic abdomen). Their attachments allow of some considerable, but still rather limited, change in position. The attachments of the intestines, on the other hand, permit a much greater range. They commonly occupy the central portions of the abdomen, but readily retract into the pelvis or lateral fossæ when occasion demands. This is especially so of the small intestine. The middle portion of the abdominal cavity, by means of its flexible anterior wall, is capable of a wide range of capacity. When the alimentary canal is empty the anterior and posterior walls may be found in thin subjects lying in close proximity, or they may lie far apart, enlarging the cavity to take care of the increase of volume due, most commonly, to filled intestines, the bladder, pregnancy, or some pathological condition. Under such pressure conditions as exist within the abdomen there is never of course a vacuum. The contents fill the containing walls completely. The organs lie one upon another or on the walls with which they come in contact. The volume of the abdominal contents cannot be very largely varied by the differences of pressure which exist under ordinary conditions. The solid and fluid contents are almost absolutely incompressible;[1] the gas alone is capable of it. When we consider that this gas is already under an atmospheric pressure of about ten meters' water column and that (according to Boyle's law) "at a constant temperature the volume of a given amount of gas varies inversely to the pressure to which it is subjected," we may readily see that even under extreme over-atmospheric conditions, say of one and one-half or two

[1] It may be well to add that straining at stool, lifting, and straining in parturition cause a sustained positive pressure of high degree, and a consequent forcing of blood and lymph already in the large abdominal vessels into the thorax, and a blocking of any further entrance of venous blood or of lymph into the abdomen, thus backing it up in the veins of the lower extremities. A little diminution of volume would be thus produced.

meters' water column that the volume would be diminished but a small fraction.

Atmospheric Pressure. Upon the walls of the abdominal cavity as well as upon the body and objects elsewhere, there is constantly exerted the pressure of the atmosphere equal, say, to about ten meters' water column, or, more familiarly speaking, say, between fourteen and fifteen pounds to the square inch (reckoned also as 1033 gm. per square cm.).[1] If the abdomen were a vacuum, it would, of course, be crushed. However, this is met by an atmospheric pressure

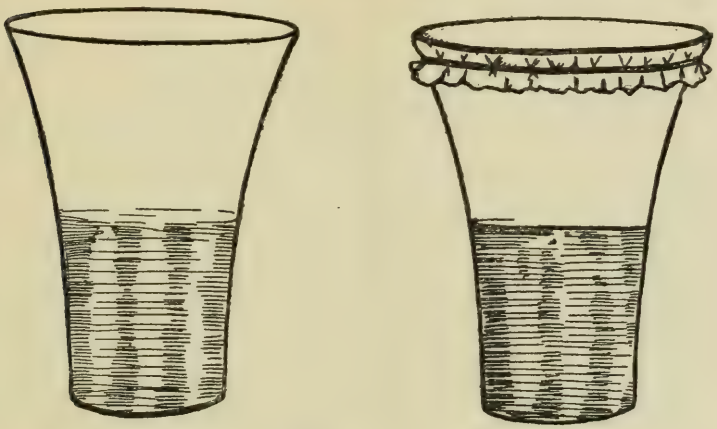

Fig. 1

equal in degree to that outside. In an open glass of water the pressure within and without are the same. The simple act of closing the glass with a membrane does not disturb the balance, but simply makes possible certain phenomena by preventing under circumstances a perfect balance of inside and outside pressure (Fig. 1). In the abdomen *any variations*

[1] An exception may be found upon the upper surface of the diaphragm within the pleural cavity where pressure is always diminished owing to the elasticity of the lungs. The diaphragm forms, of course, one of the walls of the abdomen.

from this normal equilibrium are to be explained by factors to be enumerated later.[1] By *positive pressure* we mean, of course, *over-atmospheric* pressure and by *negative pressure* we mean an *under-atmospheric* pressure.

FACTORS WHICH RAISE OR LOWER ATMOSPHERIC PRESSURE WITHIN THE ABDOMEN.

1. If we place a normal woman in a horizontal dorsal position upon a table and there is no voluntary straining of the muscles, the pressure just beneath the anterior ab-

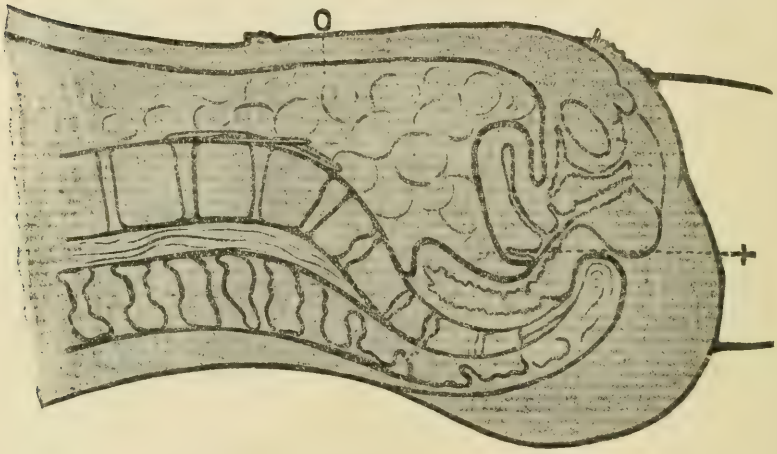

Fig. II

dominal wall will be almost the same as outside—the balance is almost exact (Fig. 2). I say directly underneath the abdominal wall because in deeper portions a positive pressure will be indicated, a matter to be discussed later. That this balance is almost exact can be demonstrated in a number of ways. First, by experiments on animals. Hörmann has

[1] We may, of course, artificially vary the *external* pressure by high altitudes, air chambers, etc., but for purposes of simplicity we will speak only of ordinary atmospheric conditions.

passed into the abdominal cavity of dogs and to a point just beneath the abdominal wall a trocar connected with a monometer. The same experiment has been carried out also by Qurin and Kelling. Only the slightest differences of pressure have been noted; at the most, perhaps, 1 or 2 cm. water column. The same fact may be demonstrated upon the operating table. If our patient, likewise in the horizontal dorsal position, is relaxed when the abdomen is opened, the viscera will protrude but little, if at all, and there is no inward rush of air. Should the former take place, we conclude that she is straining. It might be argued that these conditions were abnormal, since the subject is under an anesthetic. On a number of occasions I have repaired, without anesthesia, an abdominal wall ruptured during the convalescence from operation—the viscera were easily returned to the abdomen and showed no tendency to protrude unless the patient were straining. Again, if one examines in this same relaxed, dorsal horizontal position a patient with a ventral hernia he will find the sac relaxed. All of these facts easily disprove any idea of a constant, special, positive pressure within the abdomen such as we find argued by Schatz in his classical monograph upon the subject, published thirty-five years ago. This same idea has been very prevalent. Schatz was led to this conclusion by a series of experiments he made upon himself. He inserted an incompressible cannula into the rectum and connected the same with a manometer. He noted the higher readings due to upright positions of the body, but ascribed them to differences of muscular tension and not to hydrostatic pressure. It has been shown by Braune and Kelling that intra-abdominal pressure is not increased by the eating of food, a full bladder, or large rectal injections of water. Moritz and Hörmann have examined a large number of pregnant women near full term and have noted no, or only insignificant, differences of pressure. Kelling, on dogs, has shown that the volume of the

abdominal contents might be increased 100 per cent. without any distinct rise. In obese animals it is found that the limit is reached earlier than in thinner ones. The volume of the abdominal contents may then be increased by almost any physiological condition with insignificant, if any, rise of pressure. Once these limits are reached and the walls put upon a stretch, the pressure rises rapidly. In this connection the results of

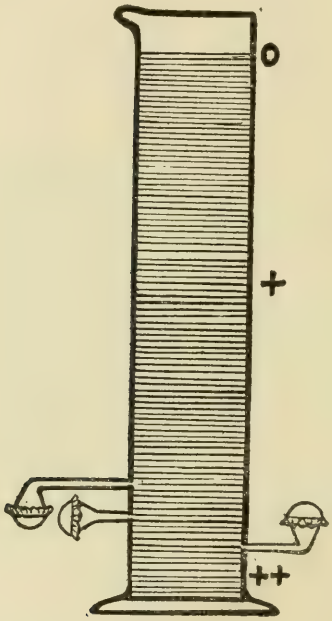

Fig III

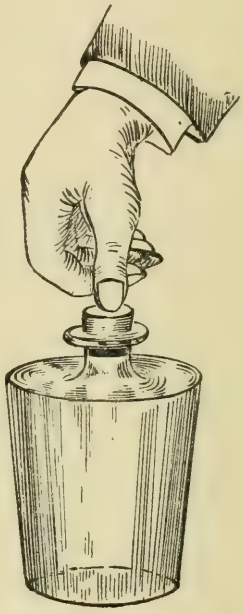

Fig. IV

Hamburger are of interest. In the course of a series of experiments on dogs to determine the effect of abdominal pressure on absorption in that cavity, he found that when such pressure was raised about 30 cm. water column that absorption was diminished and the blood pressure rapidly fell. Above 40 cm. water column serious symptoms or death were produced if not immediately relieved. In pathological

conditions Hörmann has found that tumors of considerable size and moderate amounts of ascites were attended by no increase in the abdominal pressure. This of course varies in different subjects. Qurin found that ascites causing any marked increased pressure was attended by dyspnea and other serious symptoms. In other words there seems to be a marked tendency to maintain the abdominal cavity at or

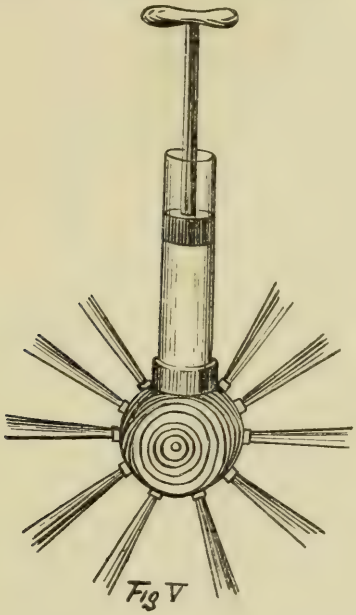

Fig V

near a balance of atmospheric pressure, and we may presume that the functions are best maintained in this way.

2. The abdomen has often been compared to a vessel containing a viscid fluid. If we do not carry it too far, we are justified in the comparison and may note in a series of most important phenomena the laws which govern fluids. We may bear in mind the following:

1. The downward pressure of a liquid is proportionate to its depth and density (Fig. 3).

2. Fluid pressure at a point of a fluid at rest is of the same intensity in all directions (Fig. 3).

3. Pressure applied to any area of an inclosed fluid is transmitted in all directions and without diminution to every part of the fluid and of the interior of the containing vessel (Figs. 4 and 5).

If we compare the abdomen to a vessel containing a liquid, we would suppose that if we were to measure the pressure at the bottom of the cavity we would find it greater than at higher levels, or, to put it in another way, if we measure the pressure in the pelvis, in an upright position of the body, we would find it lessened when we change such position. All experiments made to determine this point go to show that such is a fact. Exact figures cannot be obtained in the rectum and bladder, for special conditions prevail, owing to their muscular walls; measurements in the stomach are still less exact, because of the irritation of the tube. When sufficiently extensive and when made comparatively, they are of value in determining gross results. Hörmann, for example, in experiments made on eleven patients, showed a positive rectal pressure in the upright position, varying from 16 to 34 cm. water column. In eleven others in the knee-chest position, he showed a negative pressure varying from 2 to 14 cm. In his experiments on dogs, he inserted a cannula connected with a manometer into different parts of the peritonel cavity, varied the position of the animal, and noted the readings. He showed clearly that higher readings were obtained at lower levels. Such increase is undoubtedly due to the weight of the superimposed organs. (As in the graduate, Fig. 3.) These results may be determined on the human subject in a number of other ways. In the upright position the bulging of the perineum and lower abdominal wall, the extrusion of herniæ or of a prolapsed uterus may all be used as demonstrating the increased pressure at these points. It disproves the old idea that the abdominal organs

are altogether supported by their ligaments and mesenteries, but does not by any means definitely demonstrate that all such weight is borne by the exposed walls. The matter is complex. Measurements taken from the hollow organs lack the necessary accuracy to determine the point. The density of the total volume of the abdominal contents varies with the amount of intestinal gas present, and we have not as yet figured on a possible supporting influence from a negative pressure in the thoracic abdomen due to its rigid walls. The latter point will be shortly discussed.

4. That an under-atmospheric or negative pressure may exist in the parts uppermost at the time in the abdomen may be demonstrated in a number of ways. A simple laboratory experiment will illustrate the idea. (Fig. 6). Let us close the small end of a funnel with the thumb, fill it with water, close the larger end with an elastic membrane and reverse it. In the upper portion we have an under-atmospheric pressure due to the weight of the water column beneath and which is shown by withdrawing the thumb, when the membrane bulges and the air rushes in. Another experiment, probably more nearly approximating the real condition can be made by closing either end of a vessel with elastic membrane (Fig. 7). The contained water sinks, negative pressure is produced in the upper portion, as can be shown by the indented membrane. The same thing is shown by the common experiment of reversing a vessel in an open dish, as in Fig. 8.

Hörmann, in a series of experiments on animals, has shown that in certain positions of the body a pressure may exist in the parts which are uppermost in the abdominal cavity, provided such parts are rigid enough to resist the pressure of the atmosphere. He suspended from the shoulders dogs which were anesthetized or freshly killed and passed into the upper abdomen a cannula connected with a manometer. A slight under-atmospheric pressure was noted. He also placed the dogs horizontally, ventral wall down, with the

weight supported by the thorax and pelvis, the anterior wall hanging free; a negative pressure was noted in the lumbar

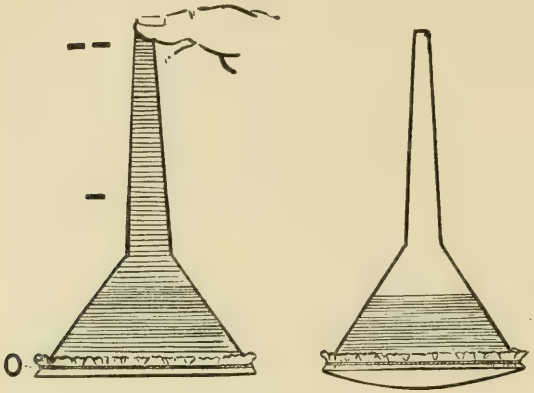

Fig VI

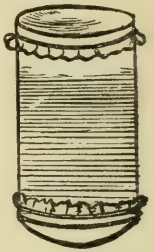

Fig VII

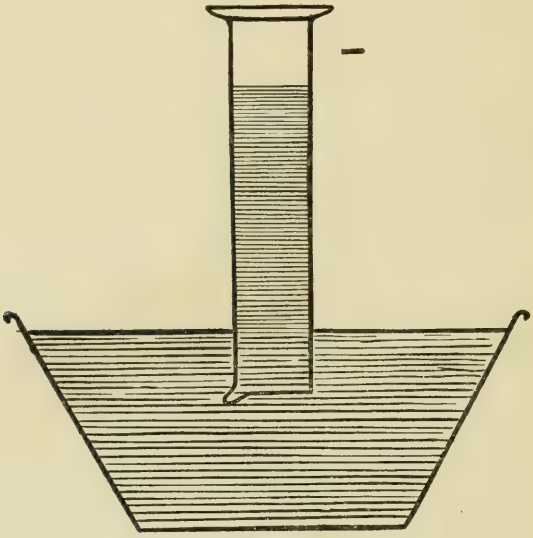

Fig VIII

region. This matter is every day demonstrated in the human subject (Fig. 9). With the woman in the knee-chest position

and relaxed, the weight of the viscera carries them toward the diaphragm. The walls of the pelvis are rigid. That a negative pressure exists within is shown by releasing one of the muscular sphincters with a speculum. Air rushes in to fill the rarified space. Again, one may demonstrate the same phenomenon on the operating table. If the patient is placed in the Trendelenburg position, with muscles relaxed and the common subumbilical incision is made, the moment the peritoneum is incised the air rushes into the abdomen to fill the space under less tension.

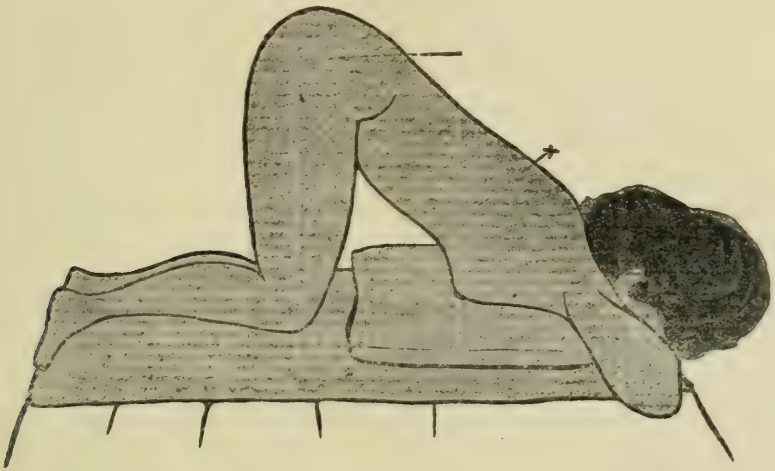

Fig. IX

The question whether in the upright position an under-atmospheric or negative pressure may exist in the upper abdomen is one which has not been very clearly demonstrated in the human subject, and yet everything would point to its probability. Hörmann, in his animal experiments just cited, found such a condition in eight dogs ranging from —1 to— 9 cm. water column. Mathes argues that since in the pleural cavity we have a negative pressure varying from 8 to 40 cm. water column (expiration or inspiration),

that on the lower side of the diaphragm a similar negative pressure obtains when it is at rest or passive. Under such conditions a balance of pressure, namely, a negative pressure on either side of the diaphragm, is obtained in the upright position, the weight of the abdominal organs opposing the upward tendency of the diaphragm and maintaining equilibrium. Hasse, in experiments on cadavers, shows that in the upright position, if the abdomen is opened and air takes the place of the viscera, that the diaphragm moves distinctly upward.

5. The effect of respiration upon abdominal pressure has been investigated by a large number of observers with varying results. We may distinguish two types of breathing—the diaphragmatic and the costal; ordinarily it is mixed. In the diaphragmatic type abdominal pressure is slightly raised by inspiration; with the costal it is slightly lowered. The change in form of the cavity is considerable; the increase and decrease of pressure but slight; at least, in ordinary breathing. Mathes, in five women, showed, by means of a colpeurynter in the vagina connected with a manometer, that in the prone position pressure was raised in inspiration; in the standing, slightly decreased. He argues, therefore, that the costal type prevails in women while standing and that the diaphragm is passive. In the prone position the conditions are reversed; the diaphragm is active; the ribs more or less inert. From his measurements we may assume that such raising and lowering of pressure is in ordinary breathing moderate. Deeper breathing causes greater waves. His investigations would show also that it is greatest in robust individuals. Mathes argues, however, that the thoracic abdomen because of thoracic negative pressure and consequent tendency of the diaphragm to move upward, plays a most important part in the support of the viscera. His argument is a strong one and lacks only actual demonstration in the human subject. A number of arguments might be brought to bear against it.

I mention it as having a strong bearing on the subject and because of the probable truth contained in it.

6. A most important component—perhaps for practical purposes the most important—is the pressure produced by the contraction of the abdominal muscles. Coughing, sneezing, defecation, labor, and many movements of the body produce within the abdomen a positive pressure which may reach one, or even two, meters' water column. Such is to be added, of course, at any point in the abdomen to that pressure already existing there. It is sufficient, even when comparatively mild, to at once wipe out any negative pressure existing. One has only to cite the annoyance caused by the straining of the patient in making rectal, vaginal, or bladder examinations in the knee-chest position. It plays a most important part in a number of bodily functions and is of prime importance in the mechanism of labor. Acting according to the law of hydrostatics already laid down, this pressure is transmitted in all directions and without diminution to every part of the contents and the interior of the abdomen.

As stated in the beginning, my object in this communication was to analyze briefly the principles and facts as we know them in regard to pressure conditions within the abdomen. There are many important matters still unsettled. It would be desirable, for instance, if we could know just what proportion of the weight is borne by the various components which give the different organs support, and pressure conditions are intimately connected with the question. It is to be hoped that there will be less indiscriminate teaching in regard to the effect of pressure upon the position of the uterus. The teaching, for example, that abdominal pressure acts only on the posterior wall of the uterus in anteversion, and only on the anterior wall in retroversion, is open at least to serious doubt. It must act on all surfaces alike that are not protected by intervening structures. The pliable bladder may easily transmit the pressure to such portions of the

anterior wall as lie beneath the peritoneum. What has been accomplished for our better understanding of pressure conditions within the abdomen has come, almost entirely, from painstaking experiment. The matter is too complex to make any other course safe, and it is to be expected that further substantial facts will be gained only in the same way.

Resume. 1. Atmospheric pressure within and without the abdomen is almost exactly balanced, any variations at any point being caused by factors to be enumerated. There is no special universal positive pressure which has so frequently been assumed. Physiological increase or decrease of volume is attended by insignificant or no changes in pressure—the balance is practically maintained. A marked increase of volume from pathological conditions often takes place without disturbing the balance; this varies in different subjects.

2. Hydrostatic pressure at any point within the abdomen varies with the position of the body and the depth of the superimposed organs.

3. Negative pressure at uppermost points is possible under certain conditions where the walls of such uppermost points are rigid. In the upper abdomen in the upright position a negative pressure may exist which has more or less to do with the support of the viscera.

4. Respiration causes small waves of pressure.

5. Coughing, sneezing, defecation, labor, and many movements of the body cause a very marked increase of intra-abdominal pressure by contraction of the muscles in the abdominal walls. Such pressure is transmitted in all directions and without diminution to every part of the contents and interior of the abdomen.

6. The facts as brought out in the paper should be applied to the problems of gynecology and obstetrics with greater accuracy than in the past.

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PAPERS

PRESENTED TO THE COUNCIL BY THE

CANDIDATES ELECTED TO FELLOWSHIP

AT THE

THIRTY-THIRD ANNUAL MEETING

TRANSPLANTATION OF OVARIES.

By Franklin H. Martin, M.D.,
Chicago.

On May 15, 1903, in a paper before the Chicago Gynecological Society, I reported 2 cases of heterotransplantation of the ovaries in human females, with a review of the literature. The cases were subsequently published in the *Chicago Medical Recorder.* In the present communication I wish to review briefly the 2 cases previously reported, and to report an additional case of heterotransplantation, and 5 cases of homotransplantation, with a complete review of the literature to the present time.

My 3 cases of heterotransplantation—2 reported in 1903 and 1 reported now for the first time—were cases in which the ovaries had been sacrificed in operations which had been performed from one and a half to two years previous to the time I attempted to give relief by operation for transplantation of ovaries from another individual. In each case an artificial menopause had become thoroughly established with exaggerated symptoms of a natural menopause, which are so often bitterly complained of by young women whose ovaries have been removed.

Two of these women were extremely anxious to be able to bear children, and in these 2 cases, (1) and (2), the tubes had been amputated flush with the uterus in the operation in which the ovaries had been removed; hence it was necessary at the operation of transplantation performed by me to also recon-

struct patent oviducts. In order that the details of my work, together with the motive, may be followed and understood, I will transcribe the preliminary report of my 2 original cases much as it appeared in the original communication.

"In the year 1901 I received a communication from a young woman, about twenty-nine years of age, asking if it would be possible to transplant ovaries into the pelvis of a woman from whom, for cause, the ovaries had been removed for dysmenorrhea without the operator having communicated to her, prior to the procedure, the fact that it would be necessary to remove those organs. Upon learning of the fact that the ovaries had been removed, she was very much horrified, as she considered her life blighted and her matrimonial prospects ruined. These reasons appealed to her strongly because of the fact that she was engaged to be married, and, since she did not menstruate, she refused to take this step unless restoration of the menstrual function were possible.

"In brooding over her strange fate, it occurred to her that it might be possible to restore the function of menstruation, and her power to conceive, by having transplanted into her sterile pelvis the necessary organs taken from another woman in whom sacrifice of healthy structure might be necessary.

"The feasibility of this idea appealed to her so strongly that she finally wrote to a number of surgeons, and one of these letters was received by me.

"At that time I did not know of the work which had been done in this line by Robert T. Morris and others. I immediately began experiments which would throw light upon this interesting subject, and I soon found that a great deal of work had already been done in this direction, dating back to about 1895. Practically nothing, however, in the way of *heterotransplantation* in the human had been attempted when this report (1902) was made. I therefore informed the patient that I would be glad to undertake the operation of ovarian grafting at any time that she would present herself and as

soon as we could get a proper case from which to remove the necessary organs.

"Accordingly, in June, 1902, a year after the time of her first communication, and two years after the date of operation in which her appendages were removed, the patient presented herself for operation.

"I carefully explained to her the difficulties which we had to surmount, and that it would be necessary to obtain a subject from whom she was to receive her specimens in whom an operation was absolutely necessary, who could furnish a sufficient amount of healthy ovarian tissue for our purpose, who had no serious constitutional taint, whose age was that of the early childbearing period, and whose race was similar to her own.

"I also clearly informed her that the operation must be looked upon entirely in the light of an experiment, and that she must be prepared to assume all responsibility with regard to failure in the outcome. Being a woman of unusual intelligence, and one who was thoroughly in earnest in her efforts to regain her normal condition, these preliminaries were very easily settled. The woman obtained a boarding place near the hospital, with the understanding that she was to report for preparation for operation at any time when a prospective case, which was likely to furnish proper specimens, entered the hospital for operation, in order that she might be operated upon immediately following the operation performed upon her benefactor. The poor woman was prepared for laparotomy at least six times between the latter part of June and July 25, before we were able to find proper material for our experiment.

"HETEROTRANSPLANTATION.

"CASE I.—On the morning of July 25, 1902, at the Post-Graduate Hospital, I operated upon a woman thirty-seven

years of age, who had borne three children, the youngest seven years old, and who had been suffering for some time from an impacted retroversion. Having previously obtained consent, I removed one-third of each ovary from this woman, taking the distal third from one ovary and the proximal third from the opposite, including with the ovarian tissue a portion of the broad ligament 2 cm. in width in each specimen. I placed the specimens in hot normal salt solution for preservation, after which the broad ligament and the severed portion of the ovary remaining were drawn together by a running suture of catgut.

"Removing these portions of the ovary, I left intact an abundance of tissue, as the ovaries were unusually developed. The portions of the ovaries removed were approximately 2 cm. in diameter, with a portion of the broad ligament already referred to.

"After completing my operation upon this woman, the second patient, the subject for transplantation, was anesthetized and a preliminary dilatation of the uterus and curettement performed, in order to render sterile the uterine cavity through which it would be necessary to make a portion of my manipulations.

"I then opened the abdomen and exposed a small, atrophied uterus, measuring, approximately, 2 inches in length, including the cervix, $1\frac{3}{4}$ inches in width, and $\frac{3}{4}$ inch in antero-posterior diameter. The tubes and ovaries were absent, and near each corner of the uterus were a few thin, cobweb adhesions, with the slight projections of $\frac{1}{4}$ inch on either side, which represented the remains of a Fallopian tube.

"My first accomplishment, obviously, was to reconstruct the remains of each Fallopian tube so that we would have a pervious oviduct. To accomplish this, I placed in the uterus a metal uterine sound, in the bulbous end of which I had constructed an eye, and this sound, with its bulbous extremity, was forced well up into the angle of the womb, opposite the

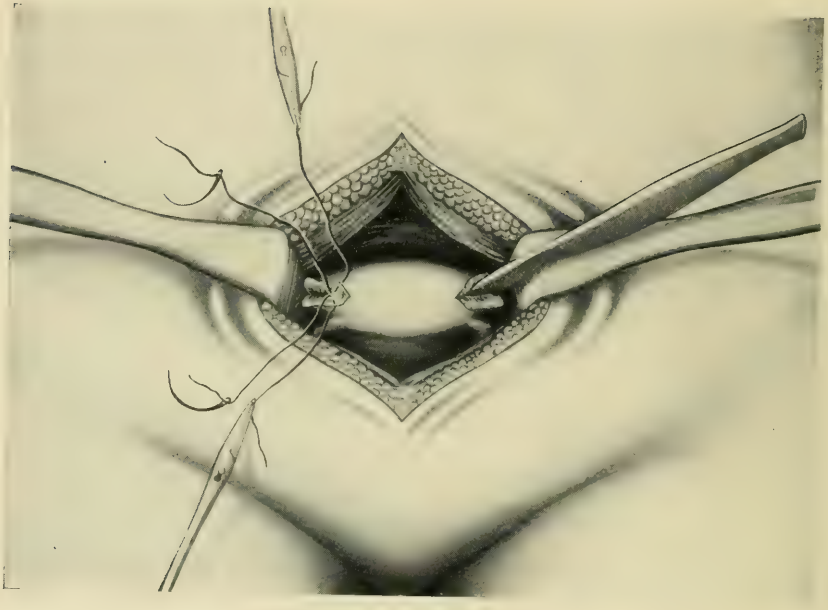

Fig. 1

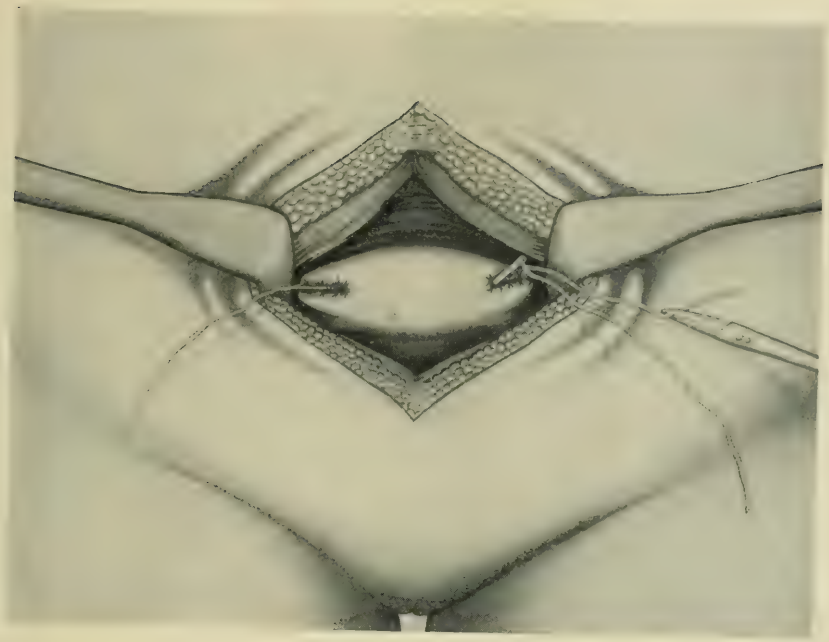

FIG. 2

impervious tube. With the sound pressed well into the corner I split the amputated tube with a scalpel, until I came to the small line marking its mucous membrane, and until the sound, pressing upon the mucous membrane of the uterus at its horn, showed through the translucent mucous membrane at that point (Fig. 1, left side).

"In order to attach the endometrium to the peritoneal coat of the uterus opposite it, I first caught, with a round needle into which was threaded a small catgut suture, an edge of the peritoneum, and then carried the needle deep into the tissue of the uterus until it impinged upon the point of the sound deep enough to grasp the mucous membrane of the uterus (Plate I, right side of patient).

"This maneuver was repeated at four different points surrounding the bulging point of the sound until I was satisfied that the peritoneal coat of the uterus and the mucous membrane of the interior of the horn of the uterus were brought together, and then, between these sutures, the sound was forced through into the peritoneal cavity (Fig. 2, left side).

"The peritoneum was then attached to the line of mucous membrane of the amputated tube in such a way as to give a mucoserous canal directly into the cavity of the uterus. I then threaded through the eye of the sound a No. 4 braided silk suture of sufficient length to enable me to draw the whole silk cord through the length of the uterus and vagina and have material enough for a portion of it to project into the peritoneal cavity to the extent of 1 inch. The sound was then withdrawn and the suture brought out to the vaginal outlet, and a portion of it left to project into the peritoneal cavity to the extent of about $\frac{3}{4}$ inch.

"I now split the broad ligament beneath the end of the amputated tube, immediately outside of the horn of the uterus, and at that point, hugging closely the tube and uterus, I attached one of the portions of ovary that I had removed for the purpose of transplantation in the following manner:

"The raw surface of the ovary was placed in the raw surface made by splitting the broad ligament, and the specimen was secured in this position by a series of eight or ten interrupted fine catgut sutures (Fig. 3, left side).

"The same procedure was carried out in every detail on the opposite side of the uterus.

"Before closing the abdomen the silk ligature was laid carefully in contact with the ovary, each projecting into the abdomen, as has been stated, about $\frac{3}{4}$ inch. I employed this ligature as an additional means of keeping patulous the newly constructed oviduct, with instructions that it be removed at the end of two weeks, unless the symptoms called for an earlier interference.

"The toilet of the peritoneum was then completed, the abdomen closed, and the patient returned to bed. As every detail of the operation was new, it consumed considerably more time than would ordinarily be necessary, the patient being upon the operating table about forty minutes.

"A loose packing of iodoform gauze was placed in the vagina and an antiseptic pad applied over the vulva, in order to protect the silk ligature which extended into the abdomen.

"The patient made an ideal recovery. The temperature remained absolutely normal, and at no time was there any indication that irritation was resulting because of necrosis of the transplanted tissues. The patient left the hospital in the best possible health at the end of three weeks.

"Case II.—Miss A., unmarried, aged twenty-four years, a nurse by profession, presented herself for an operation for transplantation of the appendages and repair of the tubes about the middle of September, 1902. This patient's object in submitting to the operation was primarily to be relieved of the severe nervous symptoms so frequently following the removal of the appendages. She had already submitted to two laparotomies, one of them two years previous to this date, in which one of her appendages was sacrificed; the second oper-

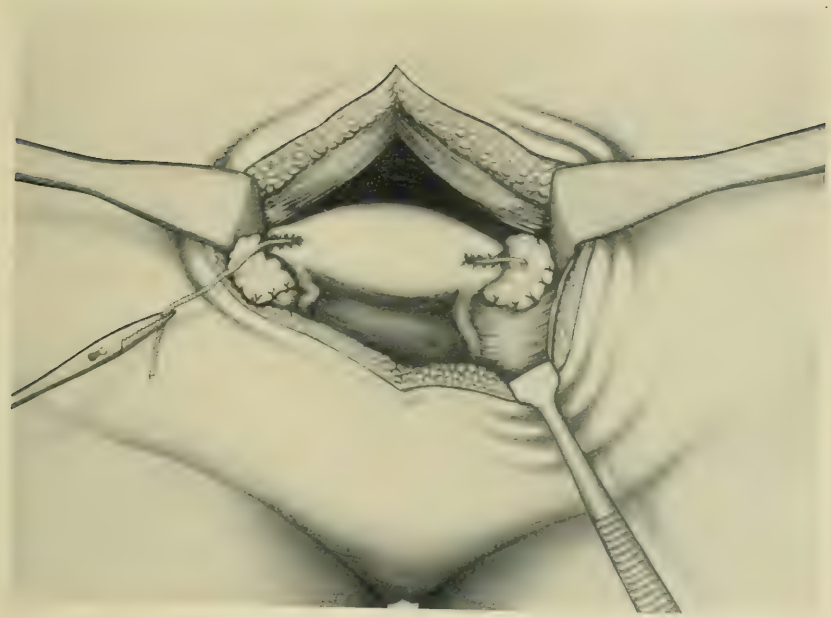

Fig. 3

ation, a year and a half prior to this time, in which the appendages of the opposite side were removed. During the last year and a half menstruation had ceased, and she had been subject to extreme nervousness and the well-known vasomotor disturbances described as 'hot flashes,' which are so often complained of in women suffering from artificial menopause. The girl was otherwise a strong, well-developed, healthy subject. She was very desirous not only of being relieved of these nervous symptoms, but of having the sexual organs so reconstructed that conception would be possible in case of marriage.

"The woman had complained, too, for some time, of a severe pain in the left side, which frequently simulated partial obstruction of the bowels.

"As this patient had been acquainted with the details of the first case I operated upon it was unnecessary to explain to her the experimental stage of the operation. She held herself in readiness, and was finally operated upon on the morning of September 24, 1902.

"I obtained my specimens for transplantation by severing, as in the previous case (having obtained consent for the operation), about one-third of each ovary from a woman upon whom I operated for chronic retroversion, and upon whom a ventral fixation was performed. This woman was twenty-five years of age, and the mother of three children. The specimens were preserved in hot salt solution, as in the previous case.

"Case II was then anesthetized, the uterus was thoroughly dilated, curetted, and sterilized, after which she was placed in the Trendelenburg position, and I made the exploratory incision for the operation. I found the omentum and a portion of the large intestine adherent to the left broad ligament at the seat of the amputation of the appendages. By using quite a little time I succeeded in removing all adhesions and bringing the uterus, which was about $1\frac{1}{2}$ inches in width,

about ¾ inch in thickness, and 2 inches in length, well up into the abdominal wound. The uterus was considerably atrophied, as these measurements indicate, being about one-half the size that one would expect in a woman possessing the development of the one on whom I did the operation. Small projections, less than ½ inch in length, marked the location of the amputation of the Fallopian tubes. The tubes and ovaries had been thoroughly removed. The operation of transplantation and repair of the tubes was carried out in every detail as described in Case I.

"The patient stood the operation without serious consequences, and her convalescence was ideal, with the exception of a slight temperature, reaching 101° on the third and fourth days. She left the hospital at the end of three weeks.

"*Comment.* In removing the portions of ovary from the salt solution where they had been lying in the interval of the operation, I was startled at their paleness, and feared that their circulation would not be reëstablished after grafting. My uneasiness was dispelled immediately after placing their denuded surfaces in contact with the exposed surfaces in the broad ligament. They immediately filled with blood by capillary action, and became swollen and extremely pink in color. I felt confident that the severed tissues would be abundantly supplied with blood by this action, until the direct continuity of vessels was established.

"*Subsequent History.* The patient returned to her home in the early part of August, with the intention of beginning her duties as a schoolteacher in September. She had recovered perfectly from her operation. It could not be expected, of course, that she would menstruate at this early date.

"*October* 19, 1902, she wrote: 'I am glad to say that my general health is as good as ever. Have been able to be in the schoolroom every day. Would feel all right if the bloating in the afternoons did not make me feel uncomfortable.'

"*October* 22, 1902. 'Have felt several times symptoms of menstruation. There has been a discharge this week resembling the white of an egg. Yesterday really expected to find that I was menstruating. Was bloated so I could breathe only with the upper half of the lungs. . . . Have had hot flashes.'

"*November* 16. 'Twenty-eight days since the appearance of what seemed symptoms of menstruation. Tonight the same symptoms appeared. Feel so full and uncomfortable.'

"*December* 25. 'There was apparently no change in my physical condition except sharp pains in the region of the ovaries.'

"*January* 20, 1903. 'For the past three days there has been pain in the ovaries, also quite profuse discharge of mucus. Also drawing sensation in vagina. Have been very much more nervous of late.'

"*February* 18. 'Another month has passed and the discharge of mucus is the same as before, also some pain across me. Otherwise I feel perfectly well. At these times seem to tire more easily and occasionally have old hot flashes.'

"*March* 20. 'I must write the same as usual. There are no further signs of menstruation than noticed in previous months. Have bloated a good deal.'

"*April* 19. 'Have had some pain, much itching, and burning sensation in the ovarian region, but other than that there is no change from other months. Am feeling real well most of the time.'

"*June* 20. The patient presented herself at my office and announced that she was menstruating. The flow lasted a portion of two days.

"*July.* Patient writes that she has on several occasions had some slight signs of menstruation. Not normal or profuse.

"Report received April 27, 1908. The patient states that a normal reëstablishment of menstruation has not occurred.

'At present I weigh about 160 pounds, and feel well. *Haven't been inconvenienced with hot flashes since the operation.* There is no vaginal discharge.'

"Case II.—Near the middle of September, 1902, was the date of the operation on the second case.

"One month after the operation I saw the patient in my office, and she expressed herself as being in good health, and asked me if it were possible for her to have menstruation in so short a time. This question was prompted by the fact that she had had a week of sensations similar to those she formerly experienced as premonitory to menstruation.

"*December* 17, 1902, three months after the operation, the patient reported at my office and said that for one week she had 'had a full feeling in the pelvis and pain in the side, and some free mucous discharge from the vagina.' She also felt depressed.

"*February* 20, 1903. Patient, having gone out of the State, wrote: 'Have a little piece of news which I think will interest you. I have been having more discharge than usual this week, and on Wednesday found a little color, but the pain was almost unbearable. I don't believe that I ever had such a backache in my life.' "

I have not received a direct personal report from this woman since above report. Indirectly I have heard about her, but unfortunately nothing further in regard to menstruation.

Case III (not previously reported).—Miss X., aged about thirty-eight years. In January, 1905, eleven months previous to the time of the present operation the tubes and ovaries had been removed in an operation for dermoid cysts. In the removal of the appendages the tube of the left side was left intact. In the operation for transplantation, the right broad ligament was found to be adherent to the head of the colon. The omentum and several coils of small intestine were adherent to the side of the previous laparotomy wound,

in the midst of which was an adherent inflamed appendix. The adhesions were carefully separated and the appendix removed. The fundus of the uterus was then drawn well up into the wound and the right broad ligament between the stump of the impacted tube and the right ligament was split longitudinally to the extent of an inch. This opening was separated with a tenaculum, exposing and uncovering the subperitoneal tissue of the broad ligament representing a denuded surface an inch in length and three-quarters of an inch in width. Upon this denuded surface was placed a thin portion of oöpheron of an ovary which had been removed from another patient within an hour and which had been preserved in a hot normal salt solution in such a way that its cut surface was applied to the subserous denuded area of the broad ligament. It was then attached at its edges to the cut surfaces of the peritoneum surrounding it by interrupted catgut sutures.

The ovary was split in such a way that in thickness it was not more than one-eighth of an inch at any portion, giving it in this way a broad base for its blood supply. Upon the left side, through a smaller opening between the broad ligament and the tube, a graft of a similar character was made within a quarter of an inch of the uterus in such a way that the tube would lie above it. A third graft was made in a similar manner parallel to the long axis of the uterus in the anterior portion of the fundus, extending from just below its crest in the direction of the bladder. In this case the graft was made directly upon the subperitoneal muscular tissue of the uterus. The uterus was then placed in its normal position, the omentum drawn well down behind it, and the abdominal wound closed in the usual way. The uterus exhibited an atrophied condition, being about two-thirds the size of a normal uterus.

Subsequent History. This patient left the hospital about three weeks after the operation. Her convalescence was practically ideal.

May, 1906, five months after the operation, the patient, in a

letter, states that she has not been relieved of the nervous symptoms; that the hot flashes have not ceased. There has been no menstruation, but some vaginal discharge. I have not been able to elicit a further report.

HOMOTRANSPLANTATION.

Case I.—Miss M., aged twenty-three years, colored. Operated upon October 8, 1902. Double pyosalpinx. Both appendages, including ovaries, were removed. The appendages were sacculated and universally adherent. A thin portion of the right ovary was resected from the mass and implanted in the broad ligament beneath the end of the amputated tube, which had been severed about an inch from the uterus. The denuded surface of the resected ovary was implanted beneath the peritoneum at the uterine end of the broad ligament and into the uterine tissue itself by means of four or five interrupted fine silk sutures. The tube was split and an attempt made to sew the peritoneal surface to the mucous uterine surface in order to preserve the oviduct. No attempt was made at transplantation or preservation of the tube upon the left side. The uterus was then suspended.

A report one year and two months later, December, 1903, records menstruation regular.

Case II.—Miss M., aged twenty-two years. Operated on January 12, 1903, for bilateral disease of the appendages, complicated with retroversion. The appendages were found much enlarged, sacculated, and adherent, and full of a thin pus. They were enucleated, and as they seemed to be beyond all possibility of repair, were removed. After carefully inspecting the specimen, upon its removal, enough normal ovarian structure was discovered by which means a transplantation might be successfully accomplished. Two portions of the tissue, each very thin, and not to exceed one-half inch in diameter, were implanted in the horn of the uterus

and the broad ligament, near the horn in the left side. The stump of the tube on this side was split and the hemostasis secured without a constricting ligature surrounding it, in order to favor, if possible, the establishment of a patulous tube. The uterus was then suspended with a strip of peritoneum.

The patient had a perfect recovery and has remained in good health; has taken a nurse's training, and has menstruated with perfect regularity and normally ever since.

Case III.—Mary Y., aged seventeen years. Operation March 23, 1903, for ventral hernia, following an operation performed by another operator one year previous. The tubes and ovaries of both sides were infected and thoroughly adherent in the cul-de-sac of Douglas, with a retroverted uterus. In the attempt to separate the adherent organs, both ovaries were found to be cystic. The cysts contained considerable straw-colored fluid. At first it appeared that both ovaries were entirely destroyed, and the cysts were removed. Upon investigation of the tubes it was found that each had a normal fimbriated end. Close examination was then made of the cystic ovaries. At two points on the cysts a thickened portion indicated considerable normal ovarian structure. This was very carefully dissected from the cysts, when the ovarian tissue from each appeared as flat disks of ovarian structure. These were placed in normal salt solution, and later transplanted in the top of each broad ligament near the horn of the uterus, as near the normal position of the ovaries as possible. Each disk of ovarian tissue was divided into two portions, and implanted with its denuded surface beneath the peritoneum, after stitching that membrane in such a way as to have the surface of the ovary project above it, fine interrupted silk sutures, about four to each piece, being employed. The uterus was suspended well forward on a strip of peritoneum.

A report on December 9, 1903, eight months after the operation, gave a scant but normal menstruation.

Case IV.—Mrs. E., age not given. Operated upon September 7, 1907. Laparotomy for parovarian cyst the size of an orange on the left side, complicated with a double pyosalpinx with general adhesions. The cyst was enucleated and the appendages removed. From one of the diseased masses was dissected a portion of normal ovarian structure. It was about the size of a quarter and about one-quarter of an inch in thickness. This was implanted in the right horn of the uterus. Transplantation was made by applying the denuded surface of the thin disk of ovary to the muscular tissue of the uterus beneath the peritoneum by means of interrupted pyoktannized catgut sutures. The uterus was suspended by a strip of peritoneum.

Case V.—Mrs. C. S. Z., aged about thirty-five years. Operated upon October 30, 1903. Diagnosis: large double pyosalpinx, with tender appendix. Laparotomy revealed very large, sacculated tubes involving the ovaries, and a cyst of the right broad ligament with an elongated appendix attached to the pyosalpinx upon the right side.

In attempting to enucleate the pathological mass, quite a large quantity of pus was evacuated. The tubes and ovaries were removed en masse, the cyst of the right broad ligament enucleated, and the appendix removed. The uterus was allowed to remain, and was of about normal size. Examination of the specimen showed a portion of the normal ovary upon the right side. This was dissected off and implanted in the right broad ligament at the horn of the uterus. This was done by burying the flat disk representing the ovary in an incision through the peritoneum on the horn of the uterus on the right side, and securing it with four interrupted silk sutures. The uterus was then suspended upon a strip of peritoneum in order to prevent its falling into the cul-de-sac and becoming adherent to the denuded peritoneal surface.

This patient, after the two months of convalescence, has menstruated, with the exception of a period of four months,

when she declared herself pregnant. This cessation of menstruation was terminated by considerable flowing at the end of four months, since which time the woman has menstruated regularly.

Remarks on Cases. *Heterotransplantation.* My 3 cases of heterotransplantation gave three excellent opportunities for observing the behavior of ovaries carefully transplanted from one human female to another, where a complete artificial menopause had become established because of the absence of the ovarian structure.

In Cases I and II there was unquestionably a revivifying influence upon the menstrual apparatus. This was shown by the appearance of vaginal discharge at intervals of thirty days for a considerable period and the discharge of blood on several occasions, and in the prompt elimination in Case I of the nervous symptoms which are observed in a menopause.

Case III unfortunately has neglected to report.

I believe more ideal results could be expected if the transplantation in these cases could have been done sooner after the primary removal of the ovaries, before all the effects of the ovarian secretion had been eliminated from the patient's tissues and thereby terminated the rhythm or habit of menstruation and thoroughly established the changes of the menopause.

Homotransplantation. Four of the five cases of homotransplantation reported regular and apparently normal menstruation. The other case did not report after the operation.

In each case the appendages were so hopelessly diseased that the ovaries were removed entirely. In each case an extremely thin portion of ovarian structure was obtainable from the sides of cysts or infected sacculated structures, with which to accomplish the graft. In the four cases reporting, the menstruation was not interrupted. These cases will illustrate what can be accomplished in the most desperate

cases in maintaining the menstrual life of women who have operations for complicated pathological conditions which require the complete removal of the ovaries.

In three of these cases in which examinations were made subsequent to the operation there was noticed no indication of the atrophy of the organs frequently noticed after castration with subsidence of menstruation.

LITERATURE.

Dr. Robert T. Morris, of New York, was the first to make a clinical report on the subject of transplantation of the ovaries. In the *New York Medical Journal* of 1895 he published his first observations on this subject, and later in the *Medical Record*, January, 1901. He also published an article in the *American Journal of Obstetrics*, in 1903, and finally an article on "A Case of Heteroplastic Ovarian Grafting, Followed by Pregnancy and Delivery of the Living Child," in the *Medical Record*, 1906.

Morris' work is extremely interesting and suggestive, and his articles must be carefully perused in order that his work may be appreciated.

In 1903 he made the statement that "ovarian grafts from one human to another, or heterotransplantation, undergo fatty degeneration within a year." He recommends, however, heteroplastic work in such cases, to prevent precipitate menopause. At this time he was experimenting on rabbits in order to immunize one animal against the serum of the other, claiming that an antagonism existed between animals even of the same species.

In his article of 1906 he reports a pregnancy after a heteroplastic implantation in a woman four years after the operation had been performed. He suggests that this case was probably one of coincident tolerance of the serum of one patient for the tissues of another.

Dr. Emil Knauer,[1] beginning in February, 1895, and covering the period up to 1899, conducted two series of experiments upon animals, one series of twelve experiments dealing with transplantation of the ovarian tissue into the original bearer of the ovary, and the other series dealing with the transplantation from one animal to another. Knauer gave to these two operations the names, respectively, of homoplastic and heteroplastic operations.

In his first group of twelve experiments he ligated off the ovaries, transplanting these in part into the mesometrium or the peritoneal fold covering the horn of the uterus on the same side of the body, and in part between the fascia and muscles of the abdominal wall. By these experiments he showed that the ovary persisted in its new locality, and that it was not only nourished there, but that it performed its functions, that Graafian follicles were developed, and that ova were expelled which were shown to be capable of impregnation. He further reports that the transplanted ovaries maintained their functions for years after the operation. By careful microscopic examination and tests of the organs after the animals were killed he also showed that the uterus and genitalia underwent no atrophy after the operation of transplantation.

In his second group of thirteen experiments upon sixteen animals, where the tissue was transplanted from one animal to another, he reports his results as not conclusive, but subject to further experiment.

Only two of these cases were what he calls partially successful. These two certainly would not be looked upon as being very conclusive. In the first the animal was killed in three weeks and the ovarian graft was discovered in an active condition. This, he said, might be criticised as a rather short interval to allow of conclusions, but stated that if degeneration took place at all, he believed it would be early. The second animal was killed in one and one-half years. On

microscopic examination no ovarian follicles were found. In this case the breasts and genitalia were atrophied.

In spite of these unfavorable results, the author believes that heteroplastic implantations can be made successful.

Knauer found new vessels in the transplanted ovaries as early as four days after the operation. At first, after the grafting, the ovaries become smaller, but later increased in size. New formation of true ovarian substance may actually occur.

Woldermann Griegorieff[7] made his experiments upon twelve rabbits, performing the homoplastic operation and transplanting the ovary of each side to the broad ligament of the same side near the uterine cornu, and showed that ovulation and conception may occur as in the normal rabbit. In post-mortem the ovaries were found normal, with Graafian follicles visible.

J. Jayle[8] made a series of ovarian grafts, covering transplantation from one rabbit to another, and from rabbits to guinea-pigs, and vice versa, but does not state his results.

Frank[9] made a series of experiments upon three patients, two with double pyosalpinx and one with cystic degeneration of the ovary. The first case, a young girl of twenty years, the second a married woman of twenty-eight years, with right hydrosalpinx and cystic degeneration of the ovary; the third, a woman aged twenty-five years, married, no children, and with double pyosalpinx. Parts of sound ovarian tissue from each patient were implanted into the uterus or the stump of the oviduct. Menstruation reappeared in all three in normal fashion, and conception in one case, but the patient aborted.

Arendt,[11 52] of Berlin, made fifteen experiments upon nineteen animals. Eleven times he transplanted the ovaries to the ligamentum latum in the same animal, on the same side, or exchanged the sides; twice he transplanted the ovary of one rabbit to the broad ligament of another, and twice the ovary of a rabbit to the ligamentum latum of a cat, and vice

versa. The transplantations were followed by the atrophy of the entire genital apparatus, including the transplanted ovaries, showing that transplanted ovaries may grow in a new locality, but that they become atrophied, as well as the uterus and cornu, in a short time (six to twelve weeks in these cases).

Hugo Ribbert,[12] of Zurich, reports experiments upon guinea-pigs. After thirty days he found that the germinal epithelium, the tunica albuginea, and the upper surface layer, with the primordial follicles, were still vital, and even showed proliferations. Transplantation was done upon the broad ligaments. In animals killed one hundred and fifty days after the operation there was no sign of atrophy of the ovaries, but the organs were functionating and ova were found. He found new vessels in the transplanted ovaries as early as four days after the graft had been formed.

E. F. Fish[13] experimented upon rabbits, making twenty successful implantations, and says: "A series of experiments, begun in December, 1896, and still being conducted, shows that, in the lower animals at least, if done under aseptic precautions, transplanting the ovary from one to another is unattended with the dangers we would expect. I had hoped . . . to prove that the function of the ovary would be reëstablished and that conception would follow. Sufficient time has not elapsed to prove or disprove anything more than that the operation of transplanting the ovary in the lower animals is as free from danger as normal oöphorectomy, unattended by pyrexia or any delay to rapid convalescence."

N. Marchese,[14] [53] Palermo, Italy, transplanted the ovaries in rabbits and female dogs and exchanged the ovaries in two pairs of female dogs. All the rabbits died, but of the dogs, only one died of peritonitis. In another the ovaries were found necrotic three months and ten days later. In the third dog, which was killed three months later, one ovary was

necrotic; the other was normal but contained no Graafian follicles.

H. Rubenstein,[15] from twelve experiments upon rabbits, in seven of which the ovary was left free within the peritoneal cavity, and in five of which it was sutured to the peritoneum, drew the following conclusions:

That whenever an ovary was successfully transplanted the uterus remained normal and showed no tendency to atrophy; but when the ovary was absorbed, atrophy of the genitalia followed. The uterus presented the same aspect as that of atrophy caused by castration; that is, atrophy of the muscularis and mucosa, thickening of the vessels, and proliferations of tissue in all the layers of the uterine wall.

Dr. A. Palmer Dudley[16] read before the International Gynecological Congress, at Amsterdam, a paper in which he reports a case of homoplastic implantations of the ovaries, and describes in detail his method (see article 17).

J. H. Glass[19] reports the following case:

Case I.—Miss S. C., aged thirty-nine years; by occupation a housemaid; applied for treatment May 9, 1898, two years before having had a double oöphorectomy for a somewhat indefinite condition. The menopause supervened promptly, the sexual instinct being diminished and soon lapsing completely. The nervous symptoms so frequently following the menopause were soon present, characterized by marked mental depression, insomnia, giddiness, palpitations, heat flashes, perspirations, pelvic pains, and constipation. Nutrition was impaired. She was chloranemic and incapable of the exertion incident to her usual occupation.

Examination demonstrated the uterus somewhat smaller than normal, flexed and fixed posteriorly. On May 11, 1898, an operation was performed, in which the uterus was disengaged and suspended to the abdominal wall, in front, the raw surface being carefully covered with peritoneum. At this time was explained to the patient the possibility of trans-

planting ovarian tissue into her pelvis from that of another patient. Soon after the following case came under observation, which seemed a favorable case for furnishing new material: Mrs. A., aged seventeen years, married, no children living, was delivered of a dead child one year before. The pelvic canal was found inadequate to the delivery of a viable child, and it was explained to the patient that childbirth by the natural route would be impossible, and only possible through Cesarean section. As the patient shrank from this alternative, it was recommended that the ovaries be removed for the purpose of preventing conception. Under the circumstances the patient readily consented to the transplantation experiment.

On May 14, or three days after the operation upon Case I for suspension of the uterus, this case, together with Case II, were anesthetized and brought to the operating room together. Resection of the tube and amputation of the ovary in Case II were rapidly performed, the healthy ovary being placed in gauze kept moist in warm normal salt solution between the times of its amputation and its implantation into Case I, which was accomplished by incising the vagina and connective tissue down to the cervix, which was stripped up to the peritoneum with the finger, which membrane was carefully raised from its attachments to a point approximating the normal position of the ovary. All oozing was controlled by compresses wet in hot salt solution, and the amputated ovary anchored in position by closing the canal through which it was introduced by two tiers of fine catgut, and the vagina was left lightly packed with gauze.

The recovery was reported as uninterrupted. From a short time after the operation until the present time the patient reports to have positive sexual impulses. Sixteen days after the transplantation menstruation occurred, and lasted two full days. No recurrence of the menses followed, however, until December 22 last (1898), when she again men-

struated, the flow continuing three days, being natural in color, consistency, and accompanied by a little pain. At this time, nearly eight months after the transplantation, the patient has apparently regained her mental condition, and says she is well, a statement apparently borne out by her deportment, good color, and generally healthy appearance.

In a note to this paper, the author states that the patient again menstruated in February, 1899.

James F. McCone,[20] in a very able paper, draws the following conclusions:

1. Contact between the ovary and tube is not essential for conception. This was demonstrated by a case which he reports as follows: "October 3, 1898, in a large white female rabbit the left ovary was completely removed and the right tube firmly ligated with sterilized silk. For a while the rabbit repelled the efforts of the buck to coitus. Ten months after the operation the rabbit gave birth to one well-formed offspring. Postmortem showed the following results: The right ovary was large and functionating. There was no ovarian tissue on the left side. Injection demonstrated the patency of the left tube and the occlusion of the right."

2. Ovaries grafted from one part of an animal to another part of the same animal continue to grow and functionate, and pregnancy can and does occur. He reports the following experiments for demonstration of this point: On October 30, 1898, in a large female rabbit, both ovaries were removed. He planted the raw surface of one ovary into the denuded pocket of the right mesosalpinx. Seven months after the operation the rabbit gave birth to three well-formed rabbits. In the postmortem there was found no excess of abdominal or pelvic fat. Uterus and tubes enlarged. The grafted ovary flourished on its new site. It was large and presented several maturing follicles. The dark corpora lutea were well shown. Illustrations accompany this report.

3. An ovary grafted from one animal to another of the

same species continues to functionate, maintains normal conditions of tubes and uterus. Pregnancy may occur. Experiment: December 20, 1898, the author castrated a large white female rabbit. He then grafted the ovaries of another rabbit, one into a pocket in the broad ligament, the other into a pocket of the omentum. Four months later the rabbit gave birth to five well-formed offspring. In this case he had successful pregnancy four months after complete castration and transplantation from another member of the same species.

4. Ovaries grafted from one species to another continue to functionate, and seem to prevent the postcastration atrophy of the tubes and ovaries. Experiment: December 23, 1898, he completely castrated a large black female rabbit. He then implanted the ovaries of a bitch, one into a pocket of the mesosalpinx, the other on the denuded surface of the omentum. Three and a half months later, he postmortemed the same rabbit. The deposit of abdominal and pelvic fat was not excessive. The uterus and Fallopian tubes were large and healthy. Both ovaries had continued to functionate, as was shown by the healthy maturing Graafian follicles. Photographic illustrations accompanied the report of this experiment.

5. The best results were obtained when the raw surface of the transplanted ovary was sewed to a denuded surface.

W. Preobrashenski[21] obtained only negative results when he transplanted the ovaries of six female rabbits into the abdomen of six male rabbits. The right ovary was extirpated, together with a piece of peritoneum, and sutured into the excavatio vesicorectal of a male rabbit. After five months the rabbit was killed and no trace of the ovary could be found. The same result was obtained in five other like cases which he experimented upon.

Later,[22] he experimented with thirty-seven rabbits and eleven cats, as follows:

1. Transplanted both ovaries from one animal to another of the same kind, after extirpation of both ovaries.

2. Transplanted ovaries, conserving the ovaries of the second animal.

3. Transplanted the ovary to the broad ligament after extirpation of uterus and the adnexa in the same animal.

4. Transplanted ovary, with resection of the uterine cornu.

5. Transplanted the ovary from a cat to a rabbit, and

6. Vice versa.

7. Grafting into mesometrium in same animal.

Results in this series of experiments were negative, except in the first case.

Joseph Halban,[24] after a review of the previous literature on the subject, reports his own experiments on eight guinea-pigs recently born, performing the following operations:

First animal: Extirpation of both ovaries and then subcutaneous transplantation.

Second animal: Same operation.

Third animal: Castration without transplantation.

Fourth animal: Same operation.

Fifth animal: Extirpation of both ovaries and transplantation in mesenterium.

Sixth animal: Castration and suturing of ovaries of fourth animal subcutaneously.

Seventh animal: Castration, and the testicles of a male guinea-pig used to replace the ovaries. One testicle is subcutaneously implanted; the other is buried in the mesenterium.

Eighth animal was not operated on, but served for controlling purposes.

These operations took place at the end of November, 1897, and were published in 1900.

Halban's conclusions are as follows: "My experiments show that transplantation of well-developed ovaries is not only successful, but that it is also possible to transplant the organs of newborn animals."

The experiments also show that the Fallopian tube grows

under the cutaneous layer and preserves even all of its most delicate features (ciliated epithelium).

In another report,[25] where he used for his experiments four monkeys, he extirpated the ovaries and implanted them subcutaneously. Two menstruated, the other two did not. One became tuberculous, and in the last only a very small particle of ovarian substance was growing. In the first two animals which menstruated, menstruation ceased as soon as the transplanted ovaries were removed.

P. Mauclaire[26] passes in review the whole literature up to 1900, and concludes by saying that the ovary may be transplanted into different parts of the body with success. One may make autografting or heterografting. The ovary implanted in the peritoneal cavity may produce ova, which may become impregnated and continue its external secretion.

In several cases he engrafted the ovary into the abdominal wound or under the skin in cases of salpingoövaritis. In seven cases of autografting four had to be removed because they were not aseptic. The three others were left, and after three months one could locate them, although they had become smaller.

Grafting could be done even after the menopause, and will be of a certain advantage to the patient.

All graftings are successful if the implanted ovary is aseptic.

These graftings may modify menstrual troubles and obviate the insufficiency of the ovaries after unilateral or bilateral ovariectomy. In cases of fibroma or cystic salpingoövaritis, if the ovary cannot be left in the abdomen, one may try subcutaneous grafting.

Maulitzka[27] made forty experiments on rabbits and the same number on guinea-pigs, planting the ovary in some cases in the female and in others in the male peritoneum.

His paper has a strictly biological character, and he calls attention to the following points:

In homoplastic transplantation the adult ovary grows,

while in heteroplastic grafting it degenerates either in part or completely.

Some of the tissues subjected to destruction preserve their proliferative power in a certain degree and show karyokinetic features.

The tissues which surround the transplanted ovary and the rapidity of formation of new vessels is in a certain proportion to the degeneracy of the different tissues.

The author says that today it is admitted by all biologists that the different cells are not independent elementary organisms.

Amico-Roxar[28] conducted a series of experiments and found first that ovaries transplanted from one spot to another in the same animal grow under favorable conditions, and that impregnation and parturition may be possible. Second, transplantation from one animal to another of the same species was possible, and that the transplanted ovary would receive nutrition and perform its functions in producing healthy normal ova. His experiments on sheep, in which castration was followed by ovarian transplantation, did not exhibit those changes in the organic metabolism which were seen in cases of ovariectomy.

Monprofit[29] performed seven operations which were completely successful, and draws the following conclusions from his work.

1. Transplantation may be carried out with ovarial rest of the same woman, if one keeps at least one small healthy particle of diseased ovary, or with ovaries of another healthy woman who was shortly before operated upon.

2. Implantation is to be made in the following localities: Uterine fundus (mucosa), interior surface of Fallopian tube, or the broad ligament in the neighborhood of the uterus.

This operation, says the author, is indicated in anomalies of the ovaries, in insufficiency of function, and finally as prophylaxis to prevent climacteric disturbances or sequelæ to castration.

W. J. Lukaschewitsch[30] conducted a series of experiments on animals, beginning his experiments in 1897, and killing the animals after three years. He extirpated both ovaries, following this by suturing one ovary taken from another animal, and arrives at the following conclusions:

1. One can transplant the ovary of one animal to another, both of whose ovaries have been lost, even grafting from a carnivorous to an herbivorous animal, and vice versa.

2. The transplanted ovaries grow, receive nourishment, and partly perform their functions.

3. To get a favorable result one has to observe the following points: (*a*) Operation must be aseptic. (*b*) Careful suturing on the mesovarium. (*c*) Transplantation of both ovaries. (*d*) Suturing close to the locality of the extirpated ovaries. (*e*) Avoid the pressure of neighboring organs on the ovary, and also the passing of sutures through the ovary.

4. The function of the transplanted ovaries is not of long duration, and the ovaries incline to senile atrophy.

5. This short duration may be explained through insufficient nourishment.

6. Notwithstanding this, well-fixed ovaries on the broad ligament prevent in a few years the atrophy of the genitalia, and the tendency of the body to fatty degeneration, and have a good influence upon the general healthy condition of the animal.

7. Impregnation (pregnancy) was not observed at all in any of the cases, although there was coition.

C. Foa,[31] of Turin, Italy, makes a thorough review of the previous literature, and, summing up the results of his own experiments, gives the following conclusions:

The embryonal ovary grows, whether implanted in the very young or in adult rabbits. It performs its functions, although it may be transplanted far from the site of its normal position.

The possibility of migration of the ovum in the uterus

from points at some distance from the original position has been demonstrated.

The embryonal ovary implanted in a male organism conserves for a short time its embryonic structure, then it begins to develop, but after a period, which may vary from ninety to one hundred and seventy days, atrophy sets in until complete reduction has been reached.

The author does not give the number of experiments from which these conclusions are drawn.

He also found[39] from animal experiments that transplanted ovaries are changed in character according to the age of the host; for example, when grafting on an old animal they degenerate and are absorbed, but upon the young adult animals they become fully developed.

W. R. Nicholson[35] gives a very complete review of the literature of transplantation of the ovaries. He reports formally no cases, and gives no results of experimental work. His article is extremely interesting, however, and must be looked upon as a classic on the subject.

His deductions are as follows:

1. That there is no doubt that in the rabbit the ovaries can be successfully transplanted.

2. That they may be placed on muscle or on peritoneum.

3. That they will not only be nourished, but will functionate.

4. That pregnancy and parturition are normal, that the young are suckled, and the young are normally developed.

Walter Schultz,[37] of Königsberg, makes two reports, in the first of which he experimented with transplantation of the ovaries into both the male and female peritoneums of guinea-pigs. In one case, where the ovary was implanted in the male peritoneum of a guinea-pig, after one hundred and seventeen days the transplanted organ was found attached to the abdominal wall of the male animal, like a small nodule with a smooth surface. The follicles found in the organs

planted in the male were smaller than those planted in the female, and the author cannot say whether or not ova were expelled from the ovaries implanted in the male abdomen.

In a second article he records the following experiments:

1. Transplanted ovaries into the same animal.
2. Transplanted ovaries from one animal into another of the same species.
3. Transplanted ovaries into male animals.
4. Transplanted ovaries from one animal into another of a different species.

Results were as follows: (*a*) Ovaries transplanted in other females of the same species may expel ova and form corpora lutea. (*b*) Ovaries implanted in male animals of same species may develop up to the forty-second day, forming normal ova, and these ova were found even as late as one hundred and seventeen days after the operation. (*c*) Ovaries transplanted from one female to another of a different species do not show any difference during the first eight days from those of the same race and species.

Out of twelve cases the author nine times had well preserved ova and follicles, of which some (in four cases) were found even after six to sixteen weeks.

Cramer[40] reviews Morris' work, and reports two cases of homoplastic graft. He cuts strips off of the sclerotic ovaries, splits the broad ligament, and partially buries the ovarian tissue under the peritoneum, bringing the raw surfaces together. One of his patients menstruated regularly after the operation, but the other did not. In his article he makes the statement that Morris, Glass, and Dudley claim to have had pregnancy in the human being after ovarian graft.

Basso,[41] in his article, summarizes the work of most of the writers on this subject, and gives results of a series of experiments of his own. His experiments were carried out on guinea-pigs and rabbits. He buried pieces of ovarian tissue under the posterior layer of the broad ligament, in the horn

of the uterus, between the peritoneum and psoas muscle, and in the anterior abdominal wall. He found that in nearly all cases of homo- or autoplastic graft the ovarian tissue was nourished and would functionate for a variable time, from four months to four years. His success with heteroplastic grafting was negative.

Carmichael[42] transplanted twenty-one ovaries in rabbits, with six failures; that is, the ovarian tissue did not live in the graft, and he doubts that absorption of the transplanted tissue is due to action of the blood serum, as suggested by Morris, but thinks it is more a matter of local condition. He found in his cases that considerable degeneration occurred in all, especially when the whole ovary was transplanted. Intramuscular transplantation was more successful than subperitoneal. Degeneration occurring in these cases is more marked in the central portion of the graft; that is, the ovarian stroma. In some cases he found Graafian follicles became cystic, and the ovary appeared as a multilocular cyst. He admits the power of ovulation, but doubts the continuance of internal secretion. He makes the statement that pregnancy has been recorded by Gordon, Doran, and others after double oöphorectomy where no transplantation was done.

Guthrie[43] carried out a series of experiments on chickens to determine the influence of the foster-mother on the young in cases of ovarian exchange. He exchanged the ovaries of black and white Leghorn hens, and, using a control, found that the color of the chickens was decidedly influenced. He concludes that transplanted ovaries functionate in a normal manner, and that the color characteristic of the chicks is influenced by the foster-mother.

Magnus[44] transplanted the ovaries of twenty-five rabbits to determine the influence upon the young. Eleven of his grafts were successful. He found that adhesions interfered in many cases with gestation. Three rabbits gave birth to young, and he concluded that at least the color was markedly influenced by the exchange.

CONCLUSIONS.

(*From personal experience and from the review of literature.*)

1. The operation of homo- or heteroplastic transplantation of the ovaries in women, or in lower animals, is no more dangerous, if accomplished aseptically, than any other small plastic operation on the appendages (Morris, Dudley, Fish, Gregorieff, Frank, Arendt, Ribbert, Rubenstein, Glass, Mauclaire, Amico-Roxar, Monprofit, Foa, Knauer, Martin).

2. Homotransplantation of ovaries in women, or in lower animals, will prevent the atrophy of the genitalia, which usually follows castration (Morris, Fish, Dudley, Griegorieff, Knauer, Lukaschewitsch, Foa, McCone, Mauclaire, Martin.)

3. It is not yet satisfactorily demonstrated that heterotransplantation of the ovaries in a considerable number of cases will give permanent relief from the nervous symptoms produced by the menopause or prevent atrophy of the genitalia otherwise following castration (Basso, Martin).

4. Heterotransplantation of ovaries in women, or in lower animals, may prevent the atrophy of the genitalia which usually follows castration (Glass, McCone, Mauclaire, Schultz).

5. Transplantation of ovaries from one species into another may result in preventing the ordinary changes in the genitalia resulting from castration (McCone, Lukaschewitsch, Schultz).

6. Menstruation will continue in women and monkeys after homoplastic transplantation of ovaries (Morris, Glass, Dudley, Frank, Mauclaire, Holban, Martin).

7. Conception has followed homotransplantation in animals (Griegorieff, McCone, Amico-Roxar, Mauclaire, Magnus).

8. Conception has followed heterotransplantation in animals (McCone, Mauclaire, Guthrie).

9. Conception has followed homotransplantation of the ovaries in women (Morris, Frank).

10. Conception has been reported following heterotransplantation of the ovaries in women (Morris).

11. Heterotransplantation of the ovaries should be accomplished as soon after the primary operation in which the receptor's ovaries have been sacrificed as possible, before the menopause has become established and the genitalia atrophied (Martin).

12. Transplanted ovaries in other localities than the normal will maintain their vitality, functionate, and prevent ordinary sequelæ of castration.

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THE INTRA-ABDOMINAL ROUTE FOR THE REMOVAL OF CALCULI FROM THE PELVIC PORTION OF THE FEMALE URETER.

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The longitudinal division of the ureter for the purpose of exploring its lumen, or removing calculi, technically called ureterotomy, has been accomplished through various routes; but the object of this paper is to advocate the removal of calculi from the pelvic portion of the female ureter by the intra-abdominal or transperitoneal route.

Since Novaro[1] first demonstrated in the human subject the possibilities of combined intra- and extraperitoneal ureteral surgery, through the intra-abdominal route, little has been accomplished to recommend it as the route for selection. Although the authorities[2] are almost unanimous in their condemnation of it, claiming that the risk of contaminating the peritoneum is altogether too great, I am of the opinion that it possesses advantages, with less risk than is supposed.

Gynecological work of today is chiefly intra-abdominal. The knowledge of pelvic pathology and familiarity with pelvic anatomy and perfected operative technique make the gynecologist especially fitted for intra-abdominal ureteral surgery. So well able is he now to protect the peritoneum from possible infection or limit the area of contamination, that he should no longer hesitate to operate within this cavity if by so doing he can insure an exactness not otherwise obtainable. Much

of the work upon the pelvic portion of the ureter has been done upon the female, and our knowledge of ureteral anastomosing has been derived chiefly from this source. The results obtained have been most encouraging, yet we do not designedly explore the ureter or remove foreign bodies from it by this route, with which we are most familiar, and where we daily combat the many sources of possible danger.

The following history is that of a case of impacted ureteral calculus, situated near the middle of the pelvic portion of the right ureter, the removal of which was planned and executed intra-abdominally through the median incision:

Mrs. C., aged thirty-nine years, married, two children, one miscarriage, referred to me by Dr. W. Allan Bartlett, was admitted to the Woman's Hospital on September 9, 1907. Last menstruation September 6, 1907. She gave the history of having been ill off and on for fifteen months. At intervals of one to three months she had "gnawing" pains in region of right kidney, lasting on each occasion several days. A chill generally accompanied the attack. No pus, blood, or "gravel" was seen in the urine till two months ago, when these appeared with frequent and painful micturition. There was more or less distress in the region of the appendix. Appetite and general condition good, but within the past few months had lost ten pounds. Previous health good; no history of cough. Great-grandfather died of tuberculosis. On admission, temperature was 97.2°; pulse, 116; respiration, 20.

Vaginal examination revealed a pronounced thickening along the vesical portion of the right ureter, which thickening could be traced as high up in the vaginal vault as the finger could reach. The vesical portion of the left ureter was also thickened, but not to the same degree. No marked pain was elicited on pressure in the vaginal vault, but on bimanual examination pain was elicited deep in the right pelvic region.

Report of Urine. Specific gravity, 1011; reaction slightly acid; oxalates in solution not increased; indican, large

amount; phosphates absent; urates absent; uric acid absent; calcium oxalate absent; few red blood corpuscles; large amount of pus; casts absent. Examined by E. E. Smith.

The radiograph by Dr. L. G. Cole showed a shadow along the entire line of the pelvic and vesical portions of the right ureter. In the middle of the pelvic portion this shadow was intensified. There was a slight shadow of the vesical portion of the left ureter. No shadow was seen in the kidney regions.

Through the cystoscope the bladder wall was seen to be studded with innumerable little cysts, and the mucosa greatly hypertrophied. The region about the mouths of the ureters was so engorged that it was impossible to catheterize either ureter.

The diagnosis was ureteritis, with phosphatic deposit in the right ureteral mucosa. Probable impacted stone in the pelvic portion of the right ureter.

The operation was performed September 10, 1907. A median abdominal incision 10 cm. in length was made. A digital exploration of the right pelvic region discovered an impacted stone in the middle third of the pelvic portion of the right ureter, or about 7 cm. from the pelvic brim. The entire ureter up to the pelvic brim was found markedly thickened. There was little or no thickening of the left ureter beyond the base of the broad ligament. The uterus, ovaries, and tubes were normal. The entire bladder wall was greatly thickened.

The patient was placed in an extreme Trendelenburg posture. The intestines gravitating toward the diaphragm were kept away from the pelvis by means of gauze pads. Other gauze pads were placed so as to cover the entire pelvic peritoneum, excepting the region of the right ureter. The right ovary was penetrated with a catgut suture and anchored to the tissues above the right broad ligament, the object of this being to remove the ovary and tube from obstructing the view of the ureter. The entire pelvic portion to the base of the broad ligament was then clearly seen, and the position of the stone was easily discerned, even by the spectators.

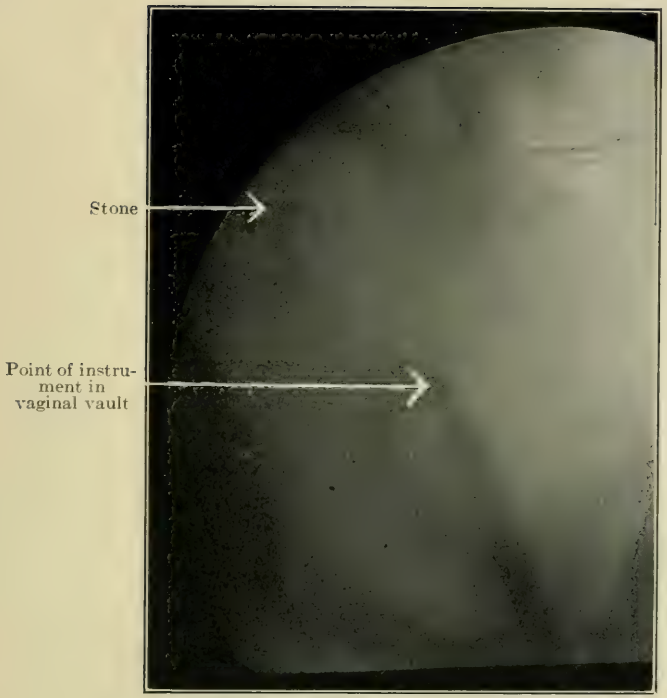

FIG. 1.—In the reduced radiograph the shadow of the thickened ureter is lost, and that of the stone very faint. The instrument indicates the direction of the vagina, and its point touches the thickened portion of the ureter.

The plan adopted to remove the calculus was as follows: An incision of the peritoneum was made at a point about 3 cm. above the site of the calculus. This incision was continued several centimeters in both directions parallel with the ureter. The peritoneum was then grasped with a long forceps and separated from the adjacent pelvic tissues, exposing the ureter several inches. Intraperitoneally the ureter could be easily recognized to and beyond the brim of the pelvis, and in order to avoid a leakage of the dammed up urine in the duct upon the extraction of the stone, a probang sponge was placed upon the ureter where it passed over the pelvic brim. A longitudinal incision was then made in the exposed ureter, immediately over the calculus, and through this the calculus was removed. Through this ureteral incision a ureteral catheter was passed upward to the kidney (the probang sponge being removed to allow its passages), and $3\frac{1}{2}$ ounces of thick purulent fluid were drained from the pelvis of the kidney. The pelvis of the kidney was then washed out through the catheter until the fluid returned practically clear. By this means it was determined that the right kidney was the probable seat of pathological changes, which supposition proved subsequently to be the case.

Examination of the urine drawn showed chiefly pus, no tubercle bacilli, and but a few staphylococci. The catheter was next passed downward and into the bladder; it met with no real obstruction, but there was noticed a slight resistance near the beginning of the vesical portion of the ureter, which was probably due to some phosphatic deposit in the hypertrophied mucosa of that portion of the duct.

The patency of the entire canal thus being insured, the ureteral incision was closed with eight No. 0 plain catgut sutures, each penetrating the walls of the ureter down to the mucosa.

The next step was to continue the separation of the peritoneal flap by blunt dissection with the finger along the line

of the ureter to the vaginal vault. A finger of the other hand was placed in the vagina, and at a point where these fingers met a puncture was made and provision for drainage established by means of a narrow strip of iodoform gauze. The flap of the peritoneum was then sutured to its original position with No. 0 catgut, and the ovary and tube replaced.

The calculus was of phosphatic character, $1\frac{1}{2}$ cm. in length and $\frac{3}{4}$ cm. in diameter, and dry weight $4\frac{1}{2}$ grains.

The appendix was next examined and found to be markedly diseased and removed. It might be here stated that some time previous to this operation a diagnosis of appendicitis had been made by another surgeon and the operation seriously considered. The microscopic examination of the appendix showed positive pathological changes, thereby establishing the previous diagnosis. Had an extra peritoneal method alone been adopted, opportunity would not have been afforded for the examination or removal of this organ.

The abdomen was closed in the usual manner. The strip of gauze in the vagina was removed in thirty-six hours. No leakage; recovery.

The case related presented, at time of operation, every element of danger feared by those who consider the intra-abdominal route unjustifiable—yet its success was absolute. In considering the method of attack I was persuaded to adopt the plan here described because my familiarity with the intra-abdominal route gave me a confidence which I could not have possessed in any route less familiar. By the use of Trendelenburg's posture I gained an unobstructed view of the pelvic floor. By the proper placing of gauze pads the peritoneum was well protected. The organs brought into view could be examined and all associated pathological conditions corrected. While these advantages were important factors in selecting the route, the device adopted to enable me to work retroperitoneally upon the ureter was of primary importance. I objected to the extraperitoneal methods

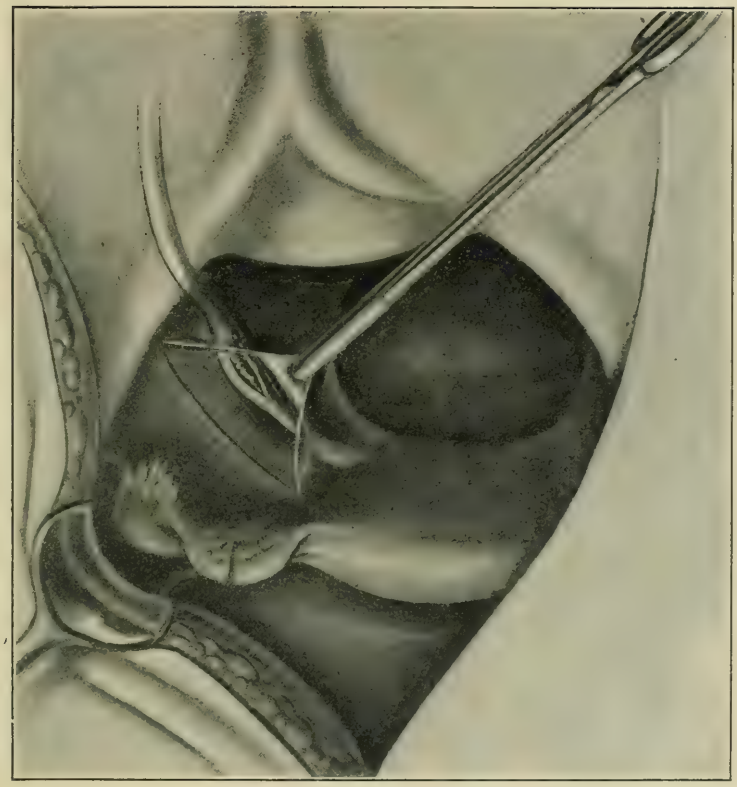

FIG. 2.—Stone *in situ*. Ureter incised. Peritoneal flap separated from region of ureter.

because the incision involved more extensive tissue area, with greater liability to injury to important structures. They offered but a limited field for vision and reparative work upon the ureter, and no opportunity to examine adjacent organs or to correct associated pathological conditions that might exist intraperitoneally. Also, if the peritoneum about the calculus be damaged as the result of erosion or ulcerative change, it would be difficult to appreciate this damage, and even more so to protect properly the peritoneal cavity if accidentally invaded.

The feature of special importance in the method adopted, and that which placed the ureteral work out of the field of intraperitoneal surgery, strictly speaking, was the peritoneal flap secured from the region immediately above the ureter in such a way as to create a roomy retroperitoneal space in which ureteral work could be easily accomplished. This flap could be so manipulated as to make an effectual barrier to possibly septic urine, if at any time such escaped through the ureteral incision. From behind this flap the stone could be removed with safety, and the entire ureteral canal also explored and the pelvis of the kidney catheterized with surprisingly little difficulty. Not only could the pelvis of the kidney be drained, but if so desired, as was done in this case, it could be thoroughly irrigated through the end of the catheter which extends out of the abdominal wound. Conditions are usually such as to admit of the formation of this retroperitoneal space, which space can always be so extended as to form a junction with the vaginal vault, thereby insuring an extraperitoneal vent for leakage. Although a good view is afforded of almost the entire length of the ureter through the intra-abdominal route, the removal of a stone and the repair of the ureter in the broad ligament portion becomes more and more difficult as we approach the vesical portion. When, therefore, a stone is found lodged at a point where manipulation posterior to the broad ligament is difficult, the severing

of the round ligament and separation of the surfaces of the broad ligament down to its base (similar to the way described by me in 1901, for ureterovesicle grafting) will furnish a large retroperitoneal space in which work upon the ureter can be accomplished with equal ease. These ligaments should be restored in the manner advocated by me in operating for retrodisplacements.

If the stone is situated in close proximity to the base of the bladder—that is, immediately below the uterine artery and about the plexus of veins derived from the lower part of the uterine and the upper part of the vaginal plexuses—difficulties and dangers may be encountered which may make the work hazardous; under these circumstances ureteral lithotomy, per vaginam, or suprapubic cysto-ureterotomy should be considered.

If a movable stone is discovered above the pelvic brim during an intraperitoneal operation, its passage into the pelvic portion of the ureter should be encouraged and its removal accomplished according to the method here described.

There is diversity of opinion regarding the necessity for suturing when lithotomy has been performed through the longitudinal incision of the ureter. Van Hook and others think it unnecessary; that the wound always takes care of itself kindly, and should be abandoned with drainage.[3] I fail to appreciate the advantage of purposely leaving conditions such as will encourage either a temporary or permanent fistula, and believe that, with the surgical knowledge now at our command, it is our duty to repair the ureteral incision in order to lessen the chances of either or both. If the work is done with the same exactness as is demanded under all other surgical conditions, we can reasonably expect the same result. The causes of failure may usually, with justice, be ascribed to the inexactness of the work, either because of the want of skill on the part of the operator, or the difficulty of manipulation through the side incision when the pelvic portion of the ureter is the seat of operation.

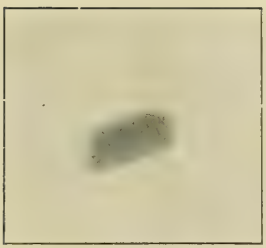

FIG. 3.—Actual size of stone.

Little or no tension on the sutures follows the longitudinal repair; therefore, soluble No. 0 plain catgut, which will keep in apposition the cut edges of the wound thirty-six or more hours, is all that is necessary. Such material has the advantage of dissolving, should union fail, thereby lessening the liability to future complications. A wound which heals by granulation contracts, and the slightest encroachment upon the caliber of the ureter necessarily increases the liability to lodgement of calculus, should it recur.

The same principles govern drainage here as govern all other cases where the question of drainage is to be considered. If the operator has not previously protected the neighboring peritoneal surfaces, and thus limited the field of possible contamination to the immediate area involved, the drain is of questionable value. In the case related the strip of gauze was placed in the retroperitoneal space, extending into the vagina, with the double object of providing for possible ureteral leakage, or drainage of any infectious material which might have been deposited retroperitoneally at time of operation. Had the surfaces become contaminated intraperitoneally I should have provided, in addition to the retroperitoneal drain, an intraperitoneal drain, passing it through Douglas' cul-de-sac, also into the vagina.

Symptoms of ureteral calculus sometimes simulate those of renal calculus; blood and pus are usually found as prominent symptoms in both, and pain is also a common symptom. When the stone is situated within or upon the kidney structure, the pain is usually dull and subacute and referred to the region of location; but when situated in the ureter, the pain (usually spasmodic or "colicky") may be referred to either the ureteral or kidney region, its severity varying with the amount of ureteral distention, which, in turn, depends on the amount of obstruction. When particularly severe along the course of the ureter, it is usually consequent upon the change of position of the stone, due to accumulated pressure in the ureter.

When the stone is located at the base of the broad ligament within reach of the finger, distress is usually elicited upon examination. Shadows in the ureteral region may be due to other causes than calculi. Leonard[4] has shown that certain small shadows in the tract of the ureter were occasioned by the presence of phleboliths or calcified lymph glands. Caldwell[5] believes that the shadow may sometimes be due to a sesamoid bone, such as is occasionally found in one of the obturator tendons. Seelig[6] misinterpreted a shadow of a concretion in the appendix and operated for a stone in the right ureter. Calcified areas in the ovary may also be misleading. Lillienthall,[7] in an article on ureteral surgery, draws attention to the possibility of error in determining by radiograph the exact position of the stone. As he states it, "The angle of the projection line of the calculus with the plane of the plate may give rise to error in localization." This mistake, if made by an operator undertaking to remove the calculus from the pelvic portion of the ureter, through the side incision, may result in confusion; but if the intra-abdominal route is chosen, this error is of little consequence.

A non-impacted ureteral calculus may change its position from day to day, and at time of operation it may differ materially from that depicted at time of radiography, but the change of position will not be misleading if the intraperitoneal route is adopted. The *x*-rays may be corroborative or suggestive, but are not always a source of positive information. Conditions at times will so confuse even the skilled interpreter of the radiograph as to make him unwilling to express a positive opinion concerning the existence or non-existence of a stone. However, it is a source of possible information, and should always be made use of.

"Ureteral catheterization upward from the bladder . . . may detect an obstruction and localize its situation, but it cannot always differentiate a stone from stricture of the ureter."[8] Howard Kelly's wax-tipped catheter, valuable as it

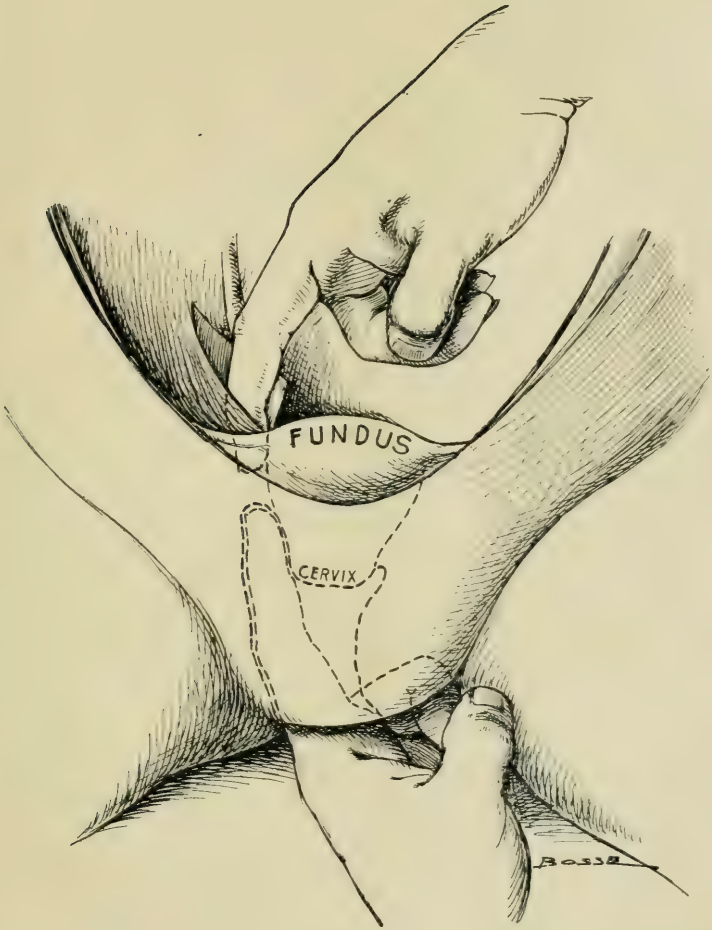

FIG. 4.—Showing the fingers in the vagina and at the base of the retroperitoneal space to direct puncture through vaginal vault for provisional drainage.

is, does not always furnish the desired information. Moreover, cases arise, as in the one under consideration, where catheterization of the ureter upward from the bladder is practically impossible, on account of the extreme hypertrophy of the bladder wall.

Bovée[9] reported, in 1905, a successful intra-abdominal operation for the removal of a very large ureteral calculus, situated at the base of the right broad ligament. The celiotomy was not done with the expectation of finding a stone (the mass felt per vaginam not being considered such), but the removal through this route was justifiable; to have resorted to any other route would, in my opinion, have given more difficulty and subjected the patient to greater danger. The technique he adopted is open to criticism. The incision in the ureter was made directly upon the mass, and on the removal of the stone a certain amount of the ureteral contents escaped into the peritoneal cavity. The surfaces of the broad ligament could have been separated so as to have protected the peritoneal cavity, and through this retroperitoneal space so created provision for leakage established per vaginam, avoiding thereby intraperitoneal drainage. The repair of the ureter was made with two layers of sutures, while one passed through the entire ureteral structure down to the mucosa is sufficient to insure apposition and union. Bovée further expresses the opinion that if a stone with rough surfaces be lodged at any one point for a considerable time, occasioning a corrosive action upon the ureteral wall, it should be removed through an incision at some point above the lodgement, as such erosion will interfere with union if the operation is done at the point of lodgement. But a stone which would, from size or roughness, cause erosion of the ureteral wall, would also, on being removed through an opening at some point above its lodgement, inflict damage to the mucosa between these points. The stone removed in the case reported by me was much larger than the caliber of the ureter; it was also rough

and embedded in the mucosa and showed every evidence of having been lodged where discovered for a considerable time. It was removed, as stated, at the point of lodgement, with resulting primary union.

In a recent article by John H. Gibbon[10] there is described a procedure adopted by him which combines intra-abdominal and extraperitoneal methods. He opened the abdomen through the right rectus muscle for diagnostic purposes, and after exploring the pelvic ureteral region with the finger and discovering the exact location of the stone, proceeded to attack it in the following manner:

On the outer side of the wound the peritoneum was stripped down to the ureter. The ureter was then dislodged and forced up by the finger within the abdominal cavity to a position in the extraperitoneal space, which allowed of an incision of the ureter and extraction of the stone. The ureter was not brought into view; therefore, the operation was done by touch, suturing not being attempted. A strip of gauze was passed down to the ureteral opening. The peritoneum was completely closed with catgut, and the other layers united, excepting at the lower angle of the wound, where the gauze made its exit. While recovery followed, leakage of urine continued for more than a month. Gibbon's method offers the same difficulty in suturing as do all extraperitoneal methods.

The only advantage which such a combined method possesses over the extraperitoneal methods is the opportunity afforded by the exploring finger within the abdominal cavity to locate the position of the stone and determine the existence or non-existence of pelvic complications. If complications are discovered, the abdominal wound must then be enlarged. Under these circumstances it offers an advantage in common with the intra-abdominal method here advocated.

Though the removal of a stone with recovery may justly be considered a surgical triumph, success from the patient's standpoint depends entirely upon the relief of all symptoms.

It is not uncommon, after correcting a given pathological condition, to find the ultimate result of the case unsatisfactory because of an associated disease left uncorrected.

It should, therefore, be our aim to adopt, when possible, such a method as will give opportunity for the correction of any and all pelvic lesions.

Since the completion of this article there has appeared an article by Dr. Gerry R. Holden,[11] in which the intra-abdominal route is advocated when the calculus is situated in the broad ligament portion of the female ureter.

In the case he relates, however, the intra-abdominal route was not adopted until after an unsuccessful effort was made to remove the calculus through a side incision. His arguments in support of the intra-abdominal route are practically those I have presented, but he limits its usefulness to that portion of the ureter situated at the base of the broad ligament. The case reported by me shows that this route is applicable to the removal of calculi situated practically in any part of the pelvic portion of the female ureter. The removal of an ovary and tube, in order to secure a better view, as advocated by him, is, in my opinion, an unnecessary sacrifice. In support of this position, I would refer to my work on uretero-vesical grafting,[12] where neither organ was sacrificed, although the field of operation was at the base of the broad ligament between its surfaces. The separation of the peritoneum by Dr. Holden along the abdominal wall, from the field of ureteral work to the lower angle of the abdominal incision, can hardly be considered a necessary procedure when ample provision for drainage had already been made retroperitoneally per vaginam.

Dr. John F. Erdmann[13] has, in a recent article, cited additional evidence in support of the view that a ureteral calculus may be mistaken for a concretion in the appendix, and vice versa.

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A REPORT OF FIFTY-TWO PREGNANCIES AND LABORS FOLLOWING VENTROSUSPENSION OF THE UTERUS FOR RETRO-DISPLACEMENTS.

By John Osborn Polak, M.D.,
Brooklyn.

The complications in pregnancy and labor which may follow the operation of ventrofixation of the uterus for retrodisplacements in the childbearing woman have been tabulated by Kelly as follows: Marked retraction of the scar, due to the tugging of the adherent uterus; constant hypogastric pain; retraction or displacement of the cervix, as the pregnancy advances, to a degree which may even carry it up into the abdominal cavity; the anterior portion of the uterine body may fail to expand and form a large, fleshy, tumorous mass obstructing the superior strait; the posterior wall may become excessively thinned and rupture; abortion and premature labor may come on spontaneously; persistent and excessive nausea may result from traction on the scar; the labor may be delayed some weeks beyond term, and when it occurs may be powerless, owing to the inability of the thinned-out posterior uterine segment to expel the fetus; the labor may be obstructed by the mass of tissue in the anterior wall, as by a tumor; the proper expansion of the cervix may be hindered by its high and abnormal position; malpresentations of the fetus may occur; or, finally, the uterus may tear loose

from its moorings with the formation of a large hematoma at the point of rupture.

Do the foregoing complications also hold true in ventrosuspension of the uterus, and is the general condemnation of the operation justified in the light of our actual knowledge of the results? These are the propositions which my personal experience with pregnancy and labor following suspensio uteri answers in the negative. I hope in this brief communication to convince some of my hearers that this simple procedure may be done with comparative safety in the course of intra-abdominal operations without the production of harm to the woman in her subsequent gestations.

In a study of the literature as to the effect of suspension of the uterus on subsequent pregnancy, I find that little or no statistical distinction has been made by the various reporters between the operations of fixation and suspension; for, upon analyzing Lynch's report (1904), one is impressed with the fact that in only 2 of the 21 cases of Cesarean section reported was a suspension operation done. Eighteen were deliberate fixations, and the nineteenth leaves doubt as to the character of the original operation. Again, in Noble's exhaustive review of the subject, presented to the American Gynecological Society in 1896, no distinction was made as to the method of operating. Andrews, in 1905, collated 395 cases of pregnancy following fixation or suspension of the uterus, with 359 patients going to term; but here again no distinction has been made between the operations. The cases reported by Heydon and William in 1906, when Cesarean section was done to relieve the dystocia, were in women on whom fixation and not suspension had been performed. Humpstone also reports three cases of Cesarean operations not previously noted in the literature, two occurring in my service at the Methodist Episcopal Hospital and one in the service of my colleague, Dr. Pomeroy, all of whom had had a ventrofixation done by general surgeons. The operations were done by

passing two or three deep silkworm-gut sutures, so as to include the posterior wall of the uterus and all of the layers of the abdominal parietes, yet one of these cases is classed as a suspension, and charged up among the unfortunate sequelæ credited to that operation. One of Peterson's two cases of suspension, which necessitated abdominal section to accomplish delivery, is the only record in which a suspensory ligament has been noted as producing such untoward symptoms. The suspension in his case of lumbosacral kyphosis with funnel pelvis resulted in a fixation and a thinning out of the posterior uterine wall during labor, as is the rule when the fundus is fixed. This must be admitted as one of the possible results of suspension. It is hardly sufficient, however, to condemn the operation, because there was present in this instance a complication, in itself sufficient to thin a uterus. Before condemning suspension, moreover, an unprejudiced observer stops to consider the thousands of suspensions done every year by various operators and the small number of complications reported.

My defence of the operation is based upon a personal experience of 687 suspensions done in the course of operations for almost all forms of tuboövarian and appendicular disease associated with retrodeviation of the uterus.

The technique of Kelly has been somewhat modified in my clinic by the substitution of No. 1 ten-day chromic gut for the silk suspension suture, and I do not go quite so low on the posterior wall of the uterus in my transfixion of that organ.

The uterus falls into good anteflexion and the patient is placed in bed in the elevated trunk posture, which directs the intra-abdominal pressure against the posterior fundal wall. Special care is taken not to scarify or irritate the point of attachment. The bladder is emptied frequently with the catheter until the patient is able to void her own urine, and the tension of a heavy uterus on its delicate suspensory adhe-

sion is minimized by the introduction of a properly fitting Byrne retroversion pessary, when pelvic plastics have not been done at the same sitting. All of these patients are made to wear a pessary for some months following the operation or until such time as the size of the uterus has become reduced. This little point of detail is, I believe, the explanation of my freedom from recurrence; only 8 relapses are to be found among the 301 private patients included in this report.

In 416 women, one, or a part of one, or both ovaries were retained and a patulous tube or tubes preserved. Out of this number, 52 pregnancies have been recorded as following the operation. Of the total 687 cases constituting the statistical basis of this contribution, 301 were private patients, of whom careful records for periods of from one to eight years have been kept. In no instance was the abdomen opened for the correction of a simple uncomplicated retroversion which could be replaced with the patient in the knee-chest position and maintained by a pessary. One hundred and seventy-eight of this group of private patients were able to conceive, any resulting sterility not being due to the impatency of the tube or tubes or to the ablation of the ovaries. Thirty-four pregnancies followed, all of which were attended in labor by the writer. Two women miscarried at the fourth month. One of these patients had had a high amputation of the cervix some months before, and had been kept in bed at the menstrual epoch throughout her gestation, owing to the occurrence of pain and dilatation at each period. An abortion was deliberately induced in the other woman for a hyperemesis due to the toxemia of pregnancy. She had suffered from a similar toxemia, and induction was called for in her previous gestation. Neither of these abortions can be attributed to the operation of suspension, as in both instances the uterus developed normally, was freely movable, and there was no dragging on the abdominal scar or hypogastric pain.

But one malpresentation occurred. This was a breech

which terminated in spontaneous delivery at the eighth month of pregnancy. The cervix in this patient was drawn up and on a higher plane than normal during the early stage of labor.

Forceps were used but twice, the indication in both patients being a slow second stage, with an imperfectly rotated head on the pelvic floor. As the position of the fetus in both of these cases was a posterior one at the beginning of labor, and both women were primiparæ, we do not feel that the dystocia, necessitating forceps, was due in any way to the suspension.

In 31 cases the head presented in one of the vertex positions, in contrast to the usual statement by most observers that malpositions are more frequent in labors following suspensions of the uterus. Twenty-nine of these women delivered themselves of children varying in weight from five pounds one ounce to eight pounds four ounces, without difficulty or intervention. The character of the labors differed in no way from the normal. The contractions of the uterus were not influenced either in power or regularity by the operation.

Labor occurred in 12 of these patients two or three weeks before the computed termination of their gestation. None was delayed more than a week beyond term. There was no fetal mortality or maternal morbidity, except in one patient, where a small broad ligament exudate existed, and there followed a mild putrid infection of the uterus, from the retention of a small piece of membrane.

One point has impressed me in all of these labors, which is at variance with the reports of other observers, namely, that the presenting part descended into and became engaged in the pelvis early, often a week or two before labor occurred, even in the multiparæ included in this series, while the frequency of this occurrence must make us doubt that it was mere coincidence, nothing in the character of the pregnancy or labor in any of these women pointing to the operation as a cause.

Of the 18 reported pregnancies and labors not attended by the writer, but included in the 52 cases cited, there were no abortions and no malpresentations. There was one premature labor at the eighth month, with spontaneous delivery; and one dystocia from an occipitoposterior position, necessitating delivery with axis traction forceps, because of the arrest of the head in the middle pelvic plane. There was one stillbirth due to a short cord. There was no maternal morbidity which can be attributed to the operation. When one can report but three forceps deliveries in 50 labors, it would seem that suspension, if there was a suspension at all in any of these patients, has little or no effect on pregnancy and labor.

Each of these 416 women, in whom pregnancy was possible, was told at the time of her discharge following the operation to report to the writer for examination if she became pregnant, or if she failed to do this and was living in the city, and should experience any difficulty at labor, to ask for consultation with him. Hence, I feel that the foregoing statistics are reliable and have a greater practical value, perhaps, than many recorded and collated by other observers.

Among the 301 patients of whom I have frequent examination records, but eight relapses occurred. Two of these followed confinement and could be reposited and held in position by a pessary.

In one woman the uterus relapsed into a position of retroflexion within a month after the operation, with a return of her pelvic symptoms. Fortunately the adhesions, freed at the time of the operation, left the uterus movable. It was reposited by bimanual manipulation and has been maintained with a pessary, which is worn with more or less comfort. The remaining 5 cases in which the operation failed to correct and retain the displacement have passed from under my observation.

I have had occasion to examine 47 of the 52 women who

became pregnant and were delivered subsequent to the suspension. In only 4 had the uterus relapsed into retroversion. Two of these, as has already been stated, could be and were replaced. Five women failed to respond to my request for permission to examine them. This is a larger proportion of uteri in position after labor than follows in the natural course of events, even in women who have had no operation for the correction of a displacement, and tends to show the permanency of the operation, notwithstanding the stretching of the suspending ligaments consequent upon the strain of pregnancy and labor. These results are superior to those obtained by me from either the Alexander, the Mann, or the Gilliam operation. It will be contended that I have not given these procedures ample consideration or sufficient clinical test to express a definite opinion as to their relative merits. This is not so, however, as each of the operations mentioned has been tried out in thirty to forty patients and the results carefully noted.

The condition of the suspensory ligaments, when the abdomen has been reopened for other conditions, has been an interesting study. Fourteen of these women have been reoperated upon, 5 have had hysterectomies for fibroids, 4 have had a secondary operation for recurrent ovarian disease, 2 have undergone a subsequent procedure for a painful and inflamed appendix, 2 have suffered from a gonorrheal infection of the tubes which necessitated their removal, and one was operated upon for an ectopic of the remaining tube. Each of these sections has given me an opportunity to note the condition, structure, position, and length of the suspensory ligament or ligaments maintaining the uterus in position. In none had fixation of the uterus occurred, notwithstanding that in three of the cases reoperated upon an extensive inflammatory process was going on within the pelvis prior to the abdomen being reopened

The ligaments varied in length from 3 to 6 cm. and were

about 1 cm. in breadth, allowing free mobility of the uterus. There were no omental or intestinal attachments in 13 of these cases. One of my hysterectomies presented dense omental adhesions to the anterior face of the uterus and its suspending ligaments. This may be explained, however, by the fact that this patient had had a myomectomy and both tubes removed six years before, affording an extensive surface for adhesion.

It has been claimed that suspension of the uterus places the organ in an abnormal relation. This statement I feel is based on prejudice rather than upon observation; for the majority of these women have been examined many times since their retrodeviations were corrected, and the uterus has been found movable and, apparently, as free in its excursions as if no attachment to the abdominal wall existed. Manipulation has failed to dislocate it backward, and only in a few cases have I observed tenderness at the site of suspension. Few of my patients have experienced any bladder irritability following the operation; and even when pregnancy has occurred the vesical symptoms have not been greater than when associated with gestation in an anteflexed uterus.

Six patients in this entire series have died, four from septic peritonitis, one from cerebral embolism, and one from ileus. This last patient was autopsied nineteen days after her operation, which had been a dilatation, curettage, appendectomy, and ventrosuspension. The uterus was found movable and lying in easy anteflexion, held by two short peritoneal bands, about 2 cm. in length, at the site of the original suspension. A loop of the ileum was found buckled on itself and adherent to the omentum, a portion of which had been resected, owing to the damage done to it while freeing its attachments in the pelvis.

"The fact that one never can say definitely that a woman will be free from serious dystocia, should she become pregnant after ventrosuspension, is enough to condemn the operation

in the eyes of the conscientious surgeon," are the words of Peterson, in closing a recent paper on Cesarean section following ventrosuspension of the uterus. My personal experience, as cited above, contradicts this statement and seems to justify me in continuing to perform the operation.

Every few months for the past fifteen or twenty years a new operation, or some modification of an old one, has been suggested to the profession for the correction of retrodisplacements, and, together with my brother surgeons, I have tested them out, each in its turn.

For nearly two years Mann's operation of folding the round ligaments upon themselves and suturing them in this shortened position was used in our work. The large number of relapses, as well as a number of subligamentous hematomata from needle punctures, caused me to abandon it. Alexander's and its modifications, Dudley's, Baldy's, as well as Goffe's, and vaginal fixation, have had attention, until Gilliam's method of suspending the uterus was published. In this operation we thought we had an ideal procedure, as it permitted not only the performance of the necessary intra-abdominal repair, needed by so many of these women, but allowed us to suspend the uterus by its natural ligaments. My records show that 33 of these operations were done, in which 6 primary suppurations occurred. Two patients became pregnant, and were delivered at term without complication. At the postpartum examination, a month after the confinement, their uteri were found low and retroplaced. The chief disadvantage of the operation is that it swings the uterus from the abdominal wall by its anterior face, and does not sufficiently anteflex it to secure and maintain the intra-abdominal pressure on its posterior surface. A second objection is the likelihood of suppuration in the wound.

My experience with pregnancy or labor, subsequent to this operation, and the complications which they may produce, is too limited to allow of any deductions.

From a critical study of the above statistics it will be seen that ventrosuspension of the uterus has not influenced or complicated any of the pregnancies or labors in this series; and while it may be contended that this was but a fortunate coincidence in the light of the many reported cases of dystocia, yet it must be admitted that the number is sufficient to justify deductions. Furthermore, these results are in accord with those of Holden, of the Johns Hopkins Clinic, who reports 83 labors in 214 women able to conceive, upon whom a suspension had been done. Only 5 of these patients required forceps to effect the delivery. Abdominal pain during pregnancy was the only other complication recorded. This occurred in five patients, one of whom was among those requiring instrumental intervention, and also in accord with the report of Beyer, who records 42 uncomplicated labors following suspension.

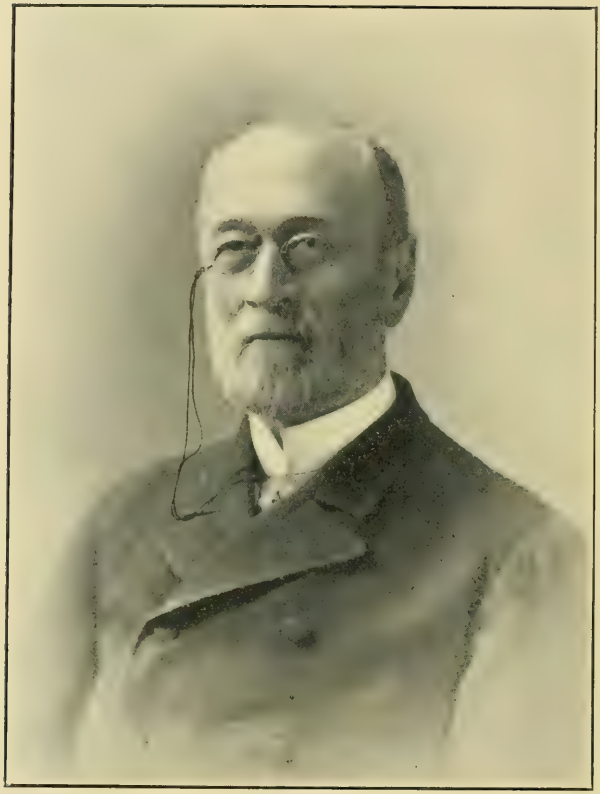
I am convinced that a properly performed suspension leaves the uterus in as good position and is as free from the possibility of relapse as any of the several procedures advocated for a permanent cure.

The Webster method of shortening the round ligaments by passing them through the broad and under the utero-ovarian ligaments, and fixing them to the posterior wall of the uterus deserves commendation, but my experience with it is limited, having used it but ten times, all in the past year. The results, therefore, are too recent to allow of any conclusions.

Many of us have been at fault in supposing that any form of suspension or shortening of the round ligaments can hold a heavy uterus with its fundus anterior without the aid of a pessary or a properly performed plastic repair of the pelvic floor to maintain the organ in its plane of circulatory equilibrium, until such time as postoperative involution has occurred. It is to the omission of this detail that many relapses attributed to suspension are due.

After labor a certain degree of involution and shortening of the suspensory ligaments occurs. This fact has been noted many times while examining these patients subsequent to their confinement. Although it is possible to dislocate the fundus backward for two or three weeks after labor, yet, when examining the same patient a month or two later, while the uterus retained perfect freedom in its excursions from side to side, the organ, when it was tipped backward by bimanual manipulation, sprang forward again into normal anteflexion when the pressure was released.

If these facts are as stated—and I believe them to be true—the simplicity and speed of the procedure must recommend it to the average surgeon, as it minimizes intra-abdominal manipulation.



William Travis Howard.

IN MEMORIAM.

William Travis Howard, M.D., LL.D.
1821—1907.

By William E. Moseley, M.D.,
Baltimore.

William Travis Howard, son of William A. Howard, an architect, was born in Cumberland County, Virginia, January 12, 1821. His collegiate education was obtained in Hampden, Sidney, and Randolph Macon Colleges. After leaving these institutions he took up the study of medicine under Dr. John Peter Mettauer, a surgeon of lower Virginia. In 1842 he entered Jefferson Medical College, and graduated in 1844, spending the intervals between the sessions as a resident student in the Baltimore Almshouse.

After graduating he settled in Warren County, North Carolina, where he practised general medicine with marked success for several years. In 1866 he removed to Baltimore, and was appointed Adjunct to the Chair of Physiology in the University of Maryland; but in January, 1867, this institution created for him a Chair of Diseases of Women and Children, which he filled with great satisfaction to both his students and his colleagues for thirty years, resigning in 1897. After his resignation he was elected Emeritus Professor of the same subjects. On May 31, 1907, the Regents of the University of Maryland conferred upon him the honorary degree of Doctor of Laws. He was appointed one of the original visiting surgeons of the Hospital for the Women of Maryland, which position he held at the time of his death. He was a

founder of the American Gynecological Society, its President in 1884 and 1885, and was made an Honorary Fellow in 1902. He was one of the founders of the Baltimore Gynecological and Obstetrical Society, and its President in 1886 and 1887. He was President of the Medical and Chirurgical Faculty of Maryland, 1902 and 1903. He was consulting surgeon to the Johns Hopkins Hospital, the Union Protestant Infirmary, and the Hebrew Hospital. He was the first American surgeon to make use of Tarnier's forceps, and invented a modification of that instrument. He also invented a bivalve speculum which bears his name.

He was not a voluminous writer, but entered freely into the discussion of papers presented before the various societies with which he was connected. His principal contributions that have been preserved are:

"Rupture of the Uterus with Laparotomy," TRANSACTIONS OF THE AMERICAN GYNECOLOGICAL SOCIETY, 1880, vol. v, 145 to 163.

"Encysted Tubercular Peritonitis, which Presented the Characteristic Phenomena of a Unilateral Ovarian or Parovarian Cyst," *Maryland Medical Journal*, 1885, xiii, 441 to 449.

The President's Annual Address, "Two Rare Cases of Abdominal Surgery," TRANSACTIONS OF THE AMERICAN GYNECOLOGICAL SOCIETY, 1885, x, 39 to 80.

The President's Address before the Medical and Chirurgical Faculty of Maryland, "During the Last Half of the Last Century was More Done for the Advancement and Growth of Medicine than was Done in Twenty-two Hundred and Fifty Years which Preceded It?" *Transactions Medical and Chirurgical Faculty of Maryland*, 1902 to 1903, 25 to 86.

Although Dr. Howard was best known as a gynecologist, he never lost his practical interest in general medicine, in which field his attainments were of a very high order, and up to the time of his death he enjoyed a large and lucrative family and consultation practice. With the younger men he was a most valuable consultant, aiding them with his acute diagnostic powers and broad knowledge of therapeutics, and at the same time protecting and strengthening their professional reputations in every legitimate way he could.

He died, after a few days illness from the effects of ptomain poisoning, at Narragansett Pier, July 31, 1907, at the age of eighty-six years.

The estimation in which he was held by his professional brothers cannot, I think, be more fairly expressed than in the report the Memoir Committee presented to the Medical and Chirurgical Faculty of Maryland at the Annual Meeting held April 28 to 30, 1908, which report I take pleasure in quoting in full: "The Medical and Chirurgical Faculty of Maryland having learned of the death of William Travis Howard, M.D., LL.D., has adopted the following: It is with feelings of profound sorrow and deep regret that this Faculty has learned of the death of its fellow-member and ex-President, William Travis Howard, M.D., LL.D. He was a valuable member as well as an ornament to this body, and the medical profession found in him an honest man in all his dealings and a man of unimpeachable integrity of character. His convictions were strong and not easily shaken, because they were formed only after careful and detailed consideration. He was a gentleman in the highest and loftiest meaning of that term. In his dealings with his fellow-members of the profession he set an example to the younger generation worthy of their imitation. His life has shown what honesty combined with brains and hard work can accomplish. He was a hard, careful, and conscientious worker in the laborious profession he chose. All that was good, straightforward, and honest appealed strongly to him; on the other hand, everything that was mean, low, and cowardly or underhand met with his unqualified disapproval. He had no patience with shams or counterfeits of any sort. Honest and conscientious himself, he demanded the same of all those who sought his esteem. He was a courageous man and did not hesitate, when the occasion arose, to express his convictions clearly and forcibly. He vigorously supported all that tended to elevate the medical profession.

"It is as the physician and surgeon that this body knew him best, and he gave to his profession the best he had of time and talents. His was a high order of talent. It was not often that his deductions in regard to any case submitted to him for analysis could be gainsaid. He placed the good of his patients before all else. No sacrifice of his time

or his talent was too great, provided his patient would receive the greatest sought-for benefit. He was a diligent and thoughtful student all his life, not only keeping well abreast of the times, but at times ahead. His attitude toward his professional brethren was most commendable. No feelings of jealousy stirred in his breast, and he often praised in no unstinted terms his fellow-workmen in the field of gynecology. He was most skilful in the special branch of the work to which he devoted so many years of his life. All recognized his knowledge, skill, and honesty, and as a result his opinions were eagerly sought for in the most trying and difficult cases. He was a broadminded man, taking an active interest in all that concerned the welfare and tended to the elevation of his fellow-man, and his well-balanced mind and fund of information made him a most agreeable companion. Few excelled him as a teacher. Clear, logical, honest, well versed in the learning of his time, endowed with a remarkable memory and enthusiastic, he imbued his students with a love for their work, and hundreds today are what they are in no small degree because of the stimulus they received from his teachings.

"He has left behind him a priceless heritage, and this Faculty has lost a most valuable member, and one who will be greatly missed from its ranks."

INDEX.

Abdomen, pressure conditions within, 469
Abdominal and vaginal celiotomy, 276
Address of President, 3
Anemia, pernicious, and pregnancy, 106
Anesthetics, general administration of, 3

Baer, B. F., when shall the operation for tubal pregnancy be performed, 83
Baldy, J. M., general administration of anesthetics, 3
Bissell, Dougal, intra-abdominal route for the removal of calculi from the pelvic portion of the female ureter, 522
Boise, Eugene, heart in shock, 390
Boldt, Herman J., abdominal and vaginal celiotomy, 291
immediate *versus* deferred operation for intra-abdominal hemorrhage due to tubal pregnancy, 72
Bovée, J. Wesley, intra-abdominal hemorrhage, 94
Brown, LeRoy, operations for relief of pelvic diseases of insane women, 165

Celiotomy, abdominal and vaginal, 276
Cesarean section, indications for, 232
versus sections of the pelvis in dealing with mechanical obstruction to childbirth, 227
Clark, John G., uterine mucosa in myoma cases, 320
Cleveland, Clement, abdominal and vaginal celiotomy, 287
Cragin, Edwin B., mechanical obstructions in confinement, 251
ventrosuspension an unsafe operation for posterior displacement of the uterus during the childbearing age, 322, 331, 334, 335
Cullen, Thomas S., condition of uterine mucosa in myoma cases, 298
Currier, Andrew F., intra-abdominal hemorrhage, 97
Cushing, E. W., intra-abdominal hemorrhage, 91
mechanical obstructions in confinement, 258
Cystocele, 145

Davis, Edward P., mechanical obstructions in confinement, 242
pubiotomy, 378
ventrosuspension, 330, 335

Dickinson, Robert L., abdominal and vaginal celiotomy, 292
hospital gynecology, 397
histories, 409
pelvic diseases of insane women, 181
Dysmenorrhea membranacea, 423

Ectopic gestation, 49
Ehrenfest, Hugo, endometritis exfoliativa-dysmenorrhea membranacea, 423
intra-abdominal hemorrhage, 98
Endometritis exfoliativa, 423

Findley, Palmer, pernicious anemia and pregnancy, 106
Frederick, C. C., abdominal and vaginal celiotomy, 296
immediate *versus* deferred operation for intra-abdominal hemorrhage due to tubal pregnancy, 46
Fry, Henry D., mechanical obstructions in confinement, 246
pubiotomy, 381
ventrosuspension, 330, 331

Gardner, Wm., intra-abdominal hemorrhage, 101
General administration of anesthetics, 3
Gestation, ectopic, 49
Goffe, J. Riddle, abdominal and vaginal celiotomy, 289
cystocele, 159
suggestions in teaching gynecology, 143
Gordon, Seth C., abdominal and vaginal celiotomy, 293
intra-abdominal hemorrhage, 90
ventrosuspension, 333
Grandin, Egbert H., immediate *versus* delayed (expectant) operation in a case of ectopic gestation, 49
intrapelvic *versus* abdominal method of dealing with mechanical obstruction to delivery in cases of confinement, 236, 260
pubiotomy, 370
Green, Charles M., mechanical obstructions in confinement, 255
Gynecological operations, technique of modern, 264
Gynecology, hospital, 397
suggestions in teaching, 115

Heart in shock, 390
Hemorrhage following section of the uterine and ovarian vessels in dogs, 433
Hirst, Barton Cooke, indications for Cesarean section, 232
pubiotomy, 380
Hospital gynecology, 397
histories, 409
Howard, William Travis, biographical notice of, 547

Immediate *versus* deferred operation for intra-abdominal hemorrhage due to tubal pregnancy, 11, 19, 35, 42, 46, 49, 54, 58, 72, 77, 83
In memoriam, 547
Insane women, pelvic diseases of, 165
Intra-abdominal hemorrhage due to tubal pregnancy, 11, 19, 35, 42, 46, 49, 54, 58, 72, 77, 83
route for the removal of calculi from the pelvic portion of the female ureter, 522
pelvic (subpubic) *versus* abdominal method of dealing with mechanical obstruction to delivery in cases of confinement, 182, 213, 227, 232, 236

Janvrin, J. E., immediate *versus* deferred operation for intra-abdominal hemorrhage due to tubal pregnancy, 77
Jewett, Charles, mechanical obstructions in confinement, 249
Johnson, Joseph Taber, intra-abdominal hemorrhage, 100

Kelly, Howard A., abdominal and vaginal celiotomy, 294
Krug, Florian, immediate *versus* deferred operation for intra-abdominal hemorrhage due to tubal pregnancy, 11, 104

McLean, Malcolm, mechanical obstructions in confinement, 254
Maier, F. Hurst, suggestions in teaching gynecology, 144
Manton, Walter P., pelvic diseases of insane women, 180
the time to operate in intra-abdominal hemorrhage due to tubal pregnancy, 54
Martin, August, a glance over the development of the technique of modern gynecological operations, 264, 297
cystocele, 161
intra-abdominal hemorrhage, 90
mechanical obstructions in confinement, 250
suggestions in teaching gynecology, 142
Martin, Franklin H., transplantation of ovaries, 489
Mechanical obstructions in confinement, 182
Montgomery, E. E., immediate *versus* deferred operation for intra-abdominal hemorrhage due to tubal pregnancy, 42
Moseley, William E., biographical notice of William Travis Howard, 547
Murray, Robert A., mechanical obstructions in confinement, 252
pubiotomy, 379
Myoma, uterine mucosa in, 298

Noble, Charles P., abdominal and vaginal celiotomy, 285
cystocele, 163
Norris, Richard C., intrapelvic (subpubic) *versus* abdominal method of dealing with mechanical obstruction to delivery in cases of confinement, 182, 261

Norris, Richard C., pernicious anemia and pregnancy, 114
pubiotomy, 383
ventrosuspension, 329

Operations for relief of pelvic diseases of insane women, 165
Ovaries, transplantation of, 489

Pelvic diseases of insane women, 165
Pernicious anemia and pregnancy, 106
Pfannenstiel, J., abdominal and vaginal celiotomy, 276, 297
cystocele, 158
intra-abdominal hemorrhage, 98
mechanical obstruction in confinement, 246
pubiotomy, 377
Polak, John Osborn, ventrosuspension of the uterus for retrodisplacements, 535
Pregnancy, tubal, 58
President's address, 3
Pressure conditions within the abdomen, 469
Pubiotomy, 336

Reynolds, Edward, choice between the intrapelvic and abdominal methods of delivery in the lesser (non-absolute) degrees of mechanical obstruction, 213, 260
Robb, Hunter, an experimental study of hemorrhage following section of the uterine and ovarian vessels in dogs, and its possible bearing on ruptured ectopic pregnancies, 433
intra-abdominal hemorrhage, 93

Sampson, John A., suggestions in teaching gynecology, 115
Shock, heart in, 390
Simpson, F. F., deferred operation for intra-abdominal hemorrhage due to tubal pregnancy, 19, 104
Smith, A. Lapthorn, Cesarean section *versus* sections of the pelvis in dealing with mechanical obstructions to childbirth, 227, 258
forty-one cases of tubal pregnancy, 58
intra-abdominal hemorrhage, 102
ventrosuspension, 333
Smith, Richard R., pressure conditions within the abdomen, 469
Stone, I. S., abdominal and vaginal celiotomy, 288
cystocele, 145
Suggestions in teaching gynecology, 115

Technique of modern gynecological operations, 264
Transplantation of ovaries, 489
Tubal pregnancy, 58

Uterine and ovarian vessels in dogs, hemorrhage following, 433
mucosa in myoma cases, 298
Uterus, ventrosuspension of, 535

Ventrosuspension, 322
of uterus for retrodisplacements, 535
Vineberg, Hiram N., immediate *versus* deferred operation for intra-abdominal hemorrhage due to tubal pregnancy, 35, 104

Wells, Brooks H., intra-abdominal hemorrhage, 99
Williams, J. Whitridge, is pubiotomy a justifiable operation, 336, 386
ventrosuspension, 328
Wylie, W. Gill, ventrosuspension, 328

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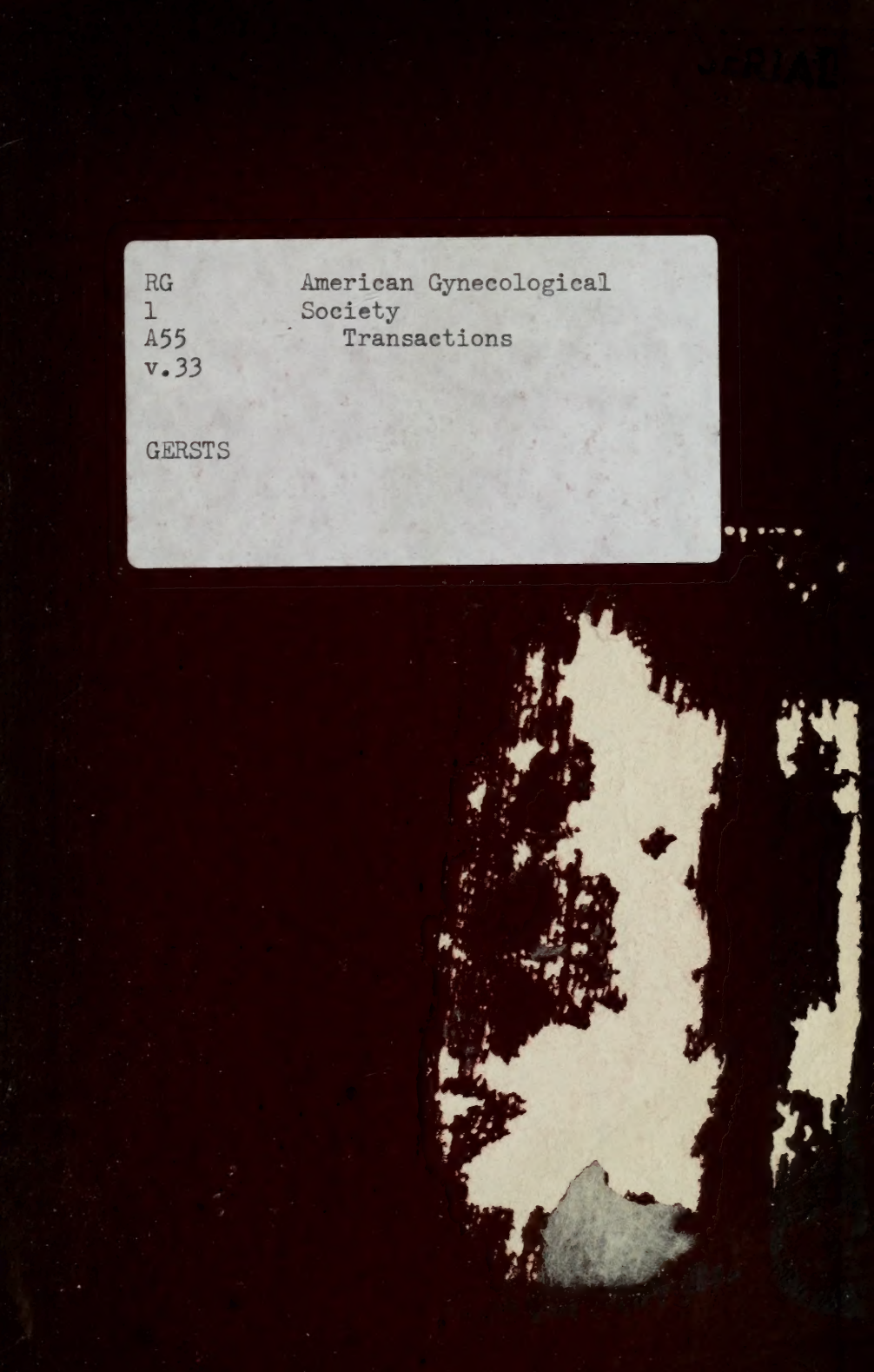
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